THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL OCTOBER, 1932

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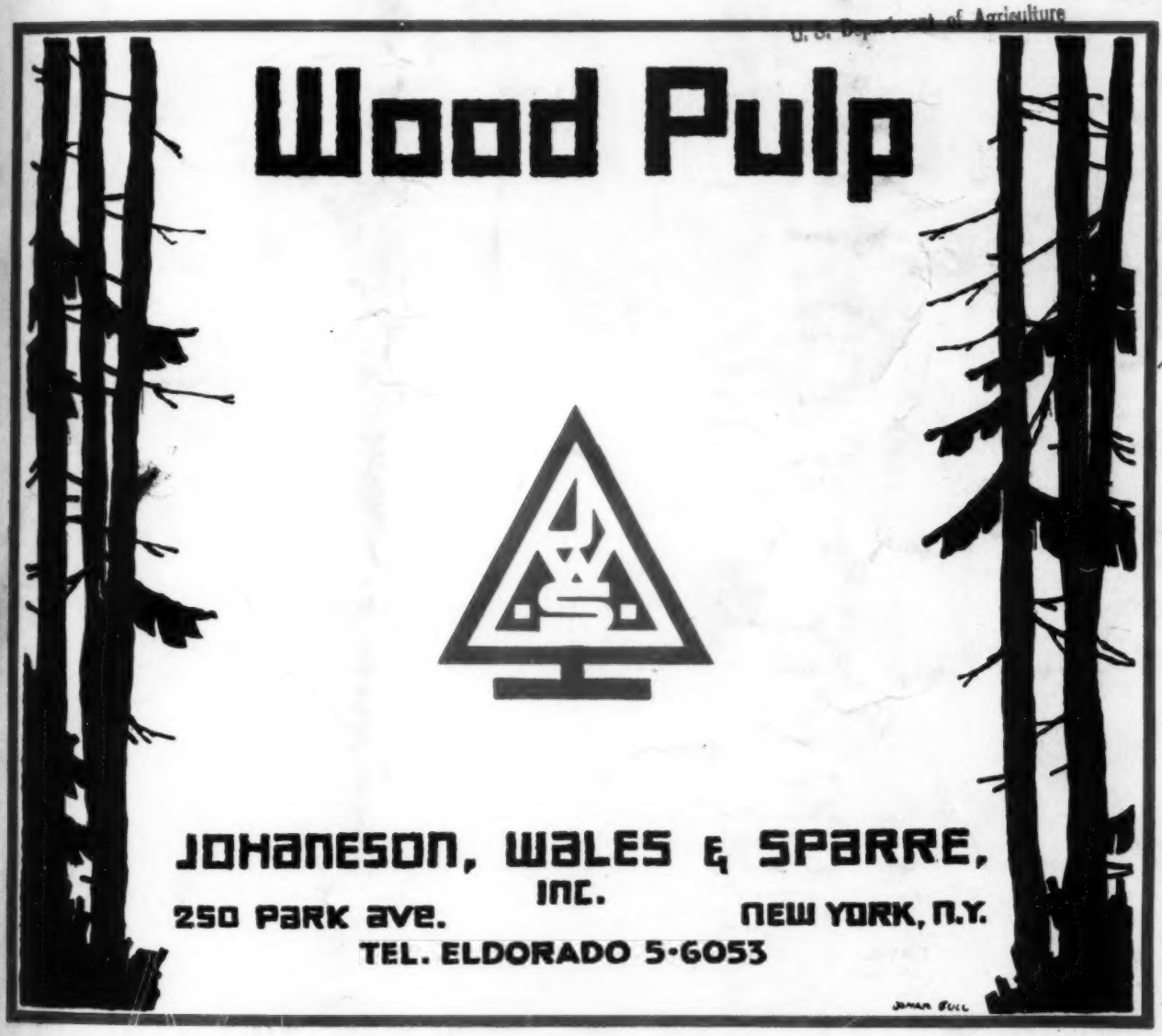

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BETTER PAPER *demanded* by *publishers*

Spotty paper with markings cannot reproduce halftones perfectly. It takes a clear, well-formed sheet to meet today's demands.

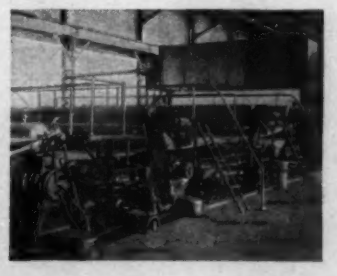
TODAY advertisers and readers alike demand the best. The use of large halftones in publishing and printing has increased over 500 per cent in five years, and the trend is decidedly upward. Large halftones need a good, clear sheet to reproduce perfectly. Thus, the publisher and printer is demanding of his mill a better, cleaner sheet, just as the advertiser is demanding the same from the publisher. Printing and engraving processes have been improved to the point where the paper used in publishing must be right or be displaced.

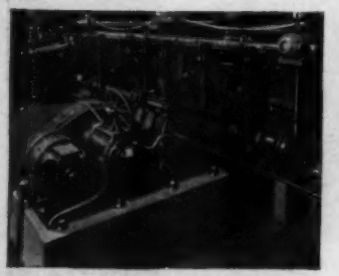
HOW BELOIT SHAKE AND SUCTION ROLLS CAN HELP PAPER MILLS

Beloit engineers have been called in to cope with this problem. The development of the Beloit Shake and Suction Rolls to their present high standard, has enabled many mills to improve the quality of their paper to meet modern needs. A better sheet has been produced in many cases at less cost than formerly.

Mill executives desiring assistance in meeting today's specifications, are invited to write us in confidence.

At Right—Beloit Suction Rolls





Above—Beloit High-Speed Super-Shake

The *Beloit* Way is the *Modern* Way

BELOIT IRON WORKS, Beloit, Wis., U.S.A.

The BELOIT

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THE PAPER INDUSTRY

OCTOBER, 1932
Vol. XIV—No. 7

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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EDWARD B. FRITZ, Publisher
A. SCOTT DOWD, Editorial Director
HARRY E. WESTON, Editor
THOS. J. KEENAN, Contributing Editor

PUBLICATION OFFICE
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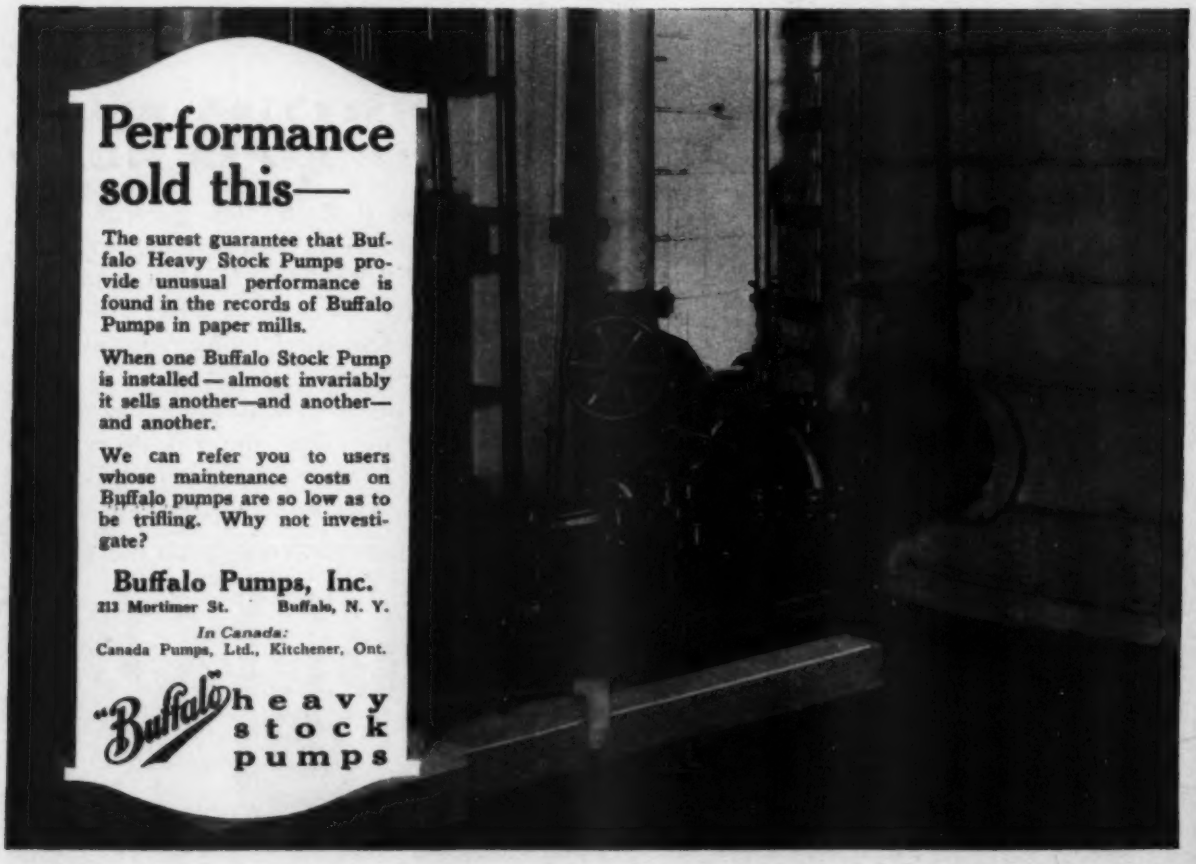
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The surest guarantee that Buffalo Heavy Stock Pumps provide unusual performance is found in the records of Buffalo Pumps in paper mills.
When one Buffalo Stock Pump is installed — almost invariably it sells another—and another—and another.
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PHOTOMICROGRAPH illustrating Uniformity of Bond and Grain Size and Grit Distribution in the Aloxite Brand Pulp Wheel. Observe the well defined burr pattern.

STILL 2 MORE POINTS WELL WORTH CONSIDERING

ABOVE—Photomicrograph illustrating Variations of Grit and Structure of Natural Pulp Stones. Note irregularity of burr pattern.

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ONE of the outstanding features of the Aloxite Brand Pulp Grinding Wheel is its structure permitting burring intervals often ranging from 48 to 72 hours.

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Another important point well worth consideration is the remarkably well defined burr pattern that can be cut on this wheel.

Grain size, grit distribution, a uniformity of bond and wheel structure, all have an influence in creating this ideal condition.

There are other features exclusive in this improved pulp grinding wheel as explained in detail in our special booklet sent on request.

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Of what importance is lubrication in the operation of speed reducers? How does incorrect lubrication affect speed reducer performance? What are the requirements of speed reducer lubricants?

These and other equally important questions are answered in the Speed Reducer Lubrication Monograph being published this month by the Technical Division of the Standard Oil Company (Indiana), a copy of which will be sent to you at your request.

As the monograph states, there are four distinct requirements necessary in a speed reducer lubricant. To meet these requirements in all types of speed reducers under all operating conditions, we have developed twelve distinct lubricants for use in gear type reducers alone. Regardless of operating conditions . . . temperatures, pressures, speed, or lubrication methods . . . there is a Standard Oil Company (Indiana) speed reducer lubricant which will give effective, economical lubrication.

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Dyestuffs Division, Wilmington, Delaware

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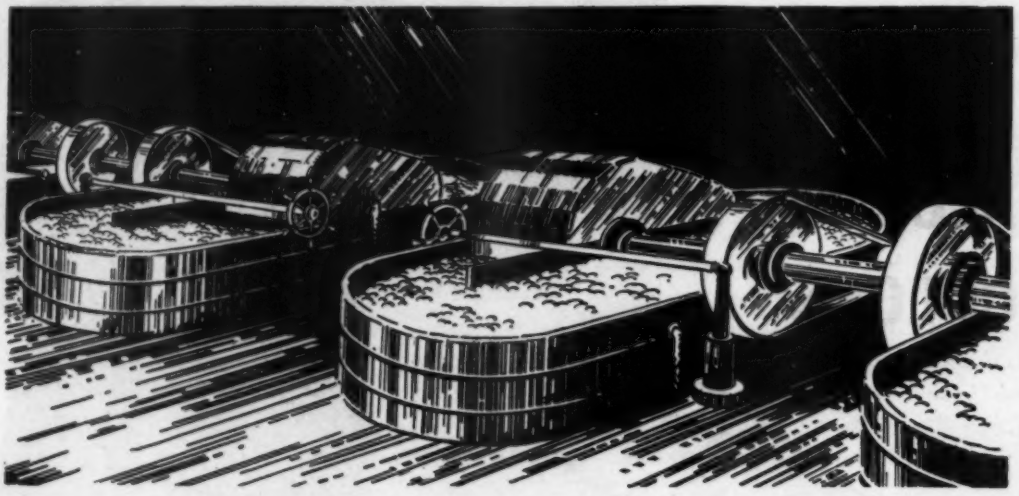
BELTING



TEST SPECIAL is a worthy leader in this staunch line of transmission belts. Anything that a good belt should do is done more efficiently — more economically — by TEST SPECIAL.

FOR more than three generations N. Y. B. & P. Co. belting has served the Paper Industry faithfully and well. Today it holds an enviable place in the trade throughout this country.

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how cheaply
BUT
how well

Satisfied users know how well Warren pumps are made . . . do you? They know that oversize parts make for long and satisfactory service . . . know that efficiencies based on liberal clearances are maintained over a long period. Experience has proven to them that a low first cost may be the beginning of a series of expenses. They use Warren pumps because they have found them *economical.* They have investigated . . . have you?

WARREN STEAM PUMP COMPANY, *Inc.*

WARREN, MASSACHUSETTS · *Agencies in principal cities*

404

If BRIAREUS LIVED TO-DAY...

with his hundreds of arms and his fifty heads, what a tender of the older-type paper machine he would be! With a pair of eyes to watch each of fifty operations, with arms stretched from every side to juggle rheostats, to make changes in draw, or to shift belts, he wouldn't even have minded losing a finger or two in lapping pulleys.

But there's no need for Briareus with a General Electric sectional drive. The adjustment of "draw" and "speed" are made from the front of the paper machine. These adjustments are made with hand cranks and hand wheels, providing changes in exceedingly fine steps. There is no uncertainty as to the number of turns to take to obtain draw adjustment, or how far to move the speed-adjusting handwheel to obtain a new paper-machine speed. Each section can be started and stopped or "inched" from the front of the machine. Any number of sections can be started simultaneously—a great convenience if you want to "spot" the wire or "rope" the dryer felts at the same time.

Why demand that your machine tender be a Briareus? With the advanced G-E sectional drive, the same operator can make better paper more cheaply—only one of many facts that work to your profit. Your nearest G-E office will be glad to supply complete information. If more convenient, address General Electric Company, Industrial Department, Schenectady, N. Y.

G-E Selsyn draw adjuster and G-E enclosed paper-machine speed-control panel . . . two important units that help simplify paper-machine operation

237-60

GENERAL ELECTRIC

Here's news about Newsprint

A BRIGHTER SHEET from groundwood, without the delays of long retention or the troubles of bisulphite liquor treatment—there's the story of the newly patented bleaching process developed by Great Western Electro-Chemical Company, employing

ZINC HYDROSULPHITE.

A year's experimentation under actual mill conditions has demonstrated the remarkable effectiveness of the zinc hydrosulphite treatment, not only on fresh Western spruce or hemlock, but also on dark or discolored stock from storage, and the treatment is now standard practice at several Pacific Coast mills.

You get a brightness with zinc hydrosulphite which has never been possible with sulphite cooking liquors. You save costly time: the new treatment is completed *in a few minutes*, as compared to 18 or 20 hours' retention period necessary for the old method. You save heating costs: zinc hydrosulphite works at ordinary room temperatures. The quantity necessary is in some cases as low as one-tenth of 1% and never exceeds 1½% of the weight of the stock.

No special equipment is necessary to change over to zinc hydrosulphite. You can apply it through your present equipment, close to the paper machine, in the beaters or mixers, or if you have a continuous system it may be run into the conveying pipes. Zinc hydrosulphite avoids all corrosion since it has but a very slight effect on the pH value of the pulp.

Experimental quantities of zinc hydrosulphite are available in 50, 100, and 200 pound drums. We shall be glad to provide detailed information on the new treatment in answer to inquiries, and Great Western technical men are available to assist in applications.

U. S. Patent No. 1,873,924 - Canadian Patent No. 307,440

GREAT WESTERN ELECTRO-CHEMICAL CO.

9 MAIN STREET, SAN FRANCISCO
SEATTLE

PLANT: PITTSBURG, CALIFORNIA
LOS ANGELES

LIQUID CHLORINE **BLEACH** **AMMONIA** **ZINC HYDROSULPHITE**

A PRODUCT with a BACKGROUND

NO CALENDER CAN BE BETTER THAN THE ROLLS IN IT

The superior finishing qualities of Perkins Calender Rolls are the natural result of the longest and broadest experience in the highly specialized art of making calender rolls.

Refills and remakes include the rolls of any manufacture, domestic or foreign, for any application in the paper industry.

B. F. Perkins & Son, Inc., Holyoke, Mass.

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Cotton Rolls
Paper Rolls
Embossing Rolls
Chilled Iron Rolls
Granite Press Rolls
Glassine Supercalenders
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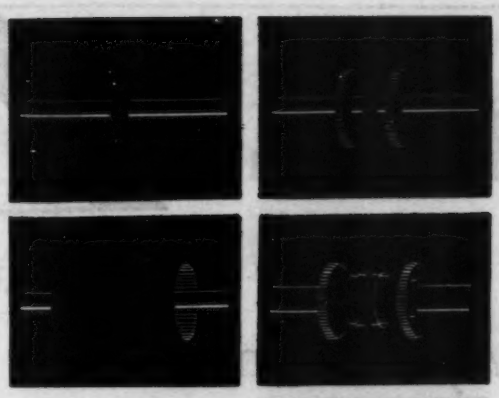
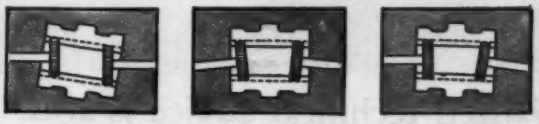
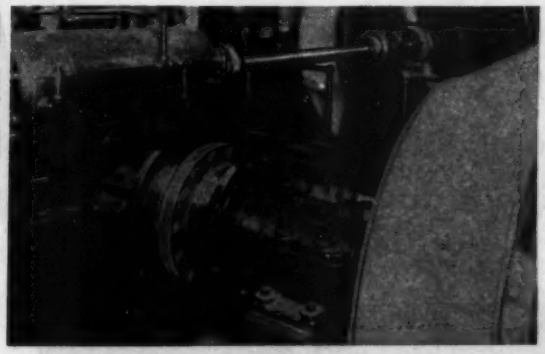


Here is the simple development of Fast's Coupling . . . A spur gear on each shaft end, a sleeve with internal gears to mesh. Oil in the sleeve carries the load.

You Can Be Through with Coupling Shut-Downs *Specify* FAST'S



Exaggerated diagrams show how all forms of misalignment are compensated for between the lubricated faces of the gear teeth. Note how entire assembly rotates as a unit.



Fast's Self-Aligning Couplings at Champion Coated Paper Company, Hamilton, Ohio

Permanently Dust-Proof

Not a single flexible material, not a single rubber or felt washer is used in Fast's Coupling. All metal to metal contact prevents dust, grit, fumes, or moisture from getting into the working assembly. Due to this exclusive principle, Fast's Couplings never cause shut-downs because of internal wear due to foreign substances.

YOUR experience will tell you that almost every coupling shut-down in your plant has been caused by the failure or breaking of a flexible pin, grid, disc, washer, or spring. Suppose these materials were done away with? Suppose the coupling was made of non-flexible materials—at all points? Wouldn't coupling shut-downs cease to plague you, cease to lose money for your plant?

In Fast's Self-Aligning Coupling exactly that has been done. Not a single flexible part. Nothing to fatigue, fail, and cause break-downs. Just a simple mechanical assembly, which, if oiled regularly, will last as long as the connected machines. See in the diagram how shaft misalignment is compensated for between the lubricated teeth of generated gears. With oil carrying the load, with no flexible materials, no wonder Fast's Couplings have banished shut-downs in thousands of plants.

Specify Fast's Couplings on all new equipment for your plant. It will free you from coupling trouble. Write today for catalog showing a Fast's Coupling for almost every industrial need.

FAST'S *Self-Aligning* COUPLINGS

THE BARTLETT HAYWARD CO.

Scott and McHenry Sts., Baltimore, Md.

Chlorine

All you want . . *Where* you want it
When you want it

●

Speedy deliveries of Chlorine are made possible due to the strategic and convenient locations of our plants.

Highly specialized technical advice is also yours for the asking.

Eighty-two successful years in making chemicals for industry is your assurance of the dependable quality of this product.

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Natrona Porous (Iron Free)
Natrona Iron Free
Excelsior Sulphate of Alumina (Commercial)
BLEACHING POWDER
(Chlorinated Lime)
PENCHLOR
(High-Test Calcium Hypochlorite)

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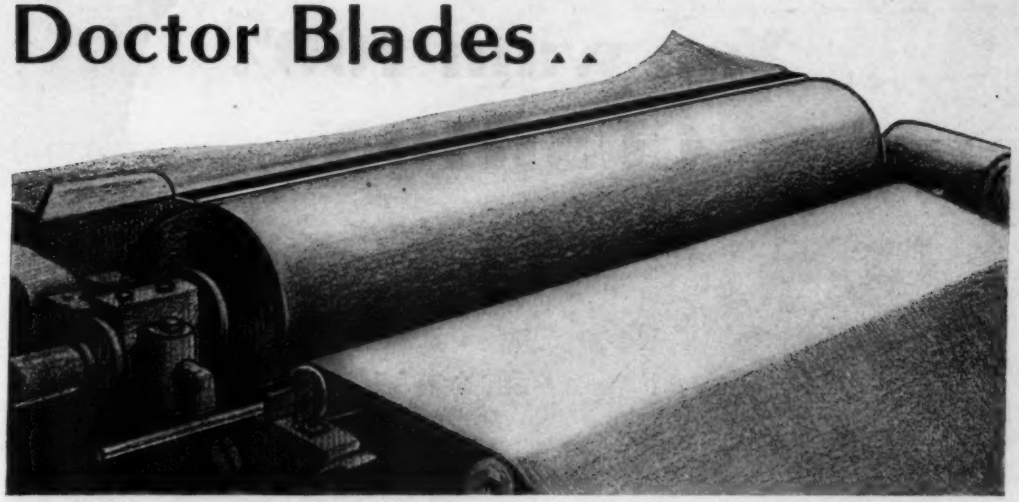
MICARTA

Doctor Blades..



they last longer

DOCTOR blades of Micarta have the combination of flexibility and toughness. The blade bears tightly against the roll without excessive pressure, cleaning it thoroughly and causing little wear on either the blade or the roll. Grooving and scoring are entirely eliminated.

Micarta doctor blades will not chip, crack, nor warp. They are not affected by acids, alkalis, or other chemicals in pulp solutions. The life of a Micarta blade, properly installed, is two years or more.

The flexibility and strength of Micarta, with its resistance to chemical solutions, adapt it especially to paper mills. Micarta already has proved its economy in a number of applications. Let us send you our folder, telling what Micarta can do in the paper industry. Just mail the coupon.

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Quality workmanship guarantees every Westinghouse product

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Westinghouse Electric & Manufacturing Company
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Please send me Folder 8237, What Micarta Can Do in the Paper Industry.

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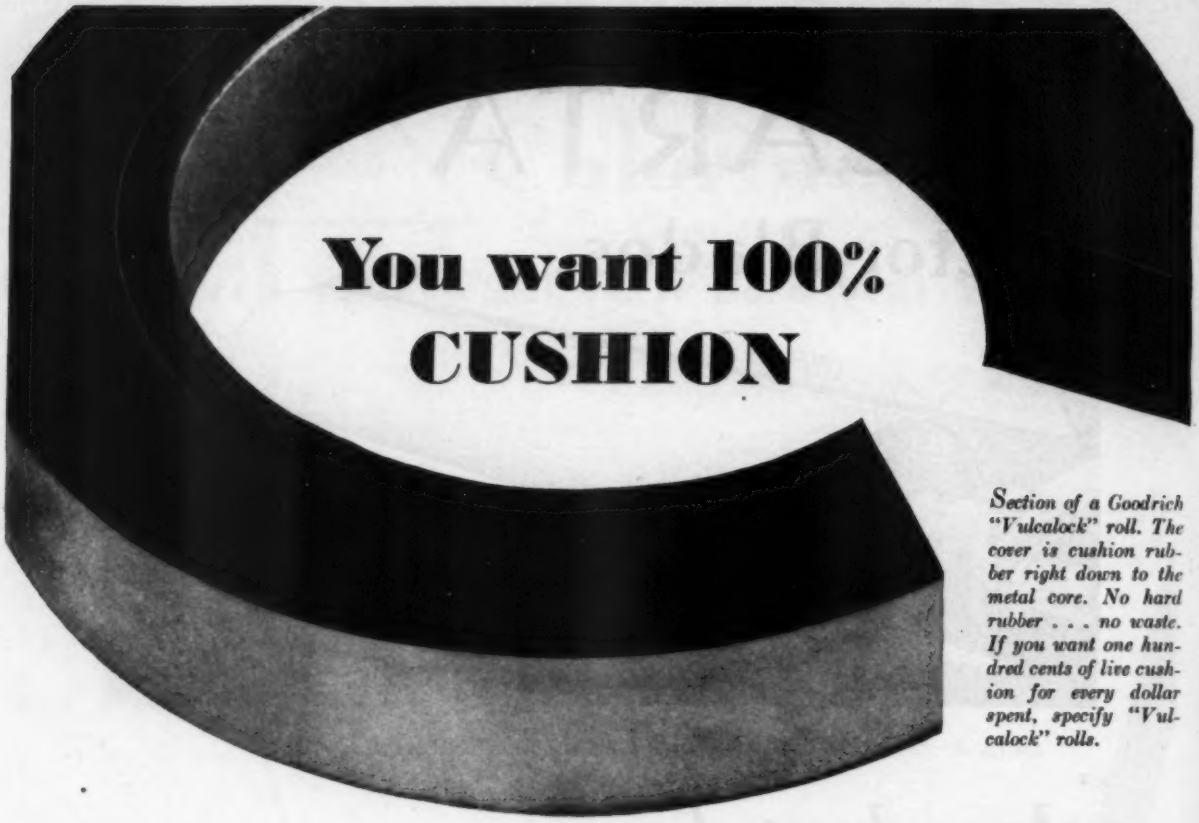
Company .....

Address .....

City ..... *State* ..... PI 10-32



Section of a Goodrich "Vulcalock" roll. The cover is cushion rubber right down to the metal core. No hard rubber . . . no waste. If you want one hundred cents of live cushion for every dollar spent, specify "Vulcalock" rolls.

Don't pay for USELESS HARD RUBBER

WHEN you buy a roll — you want cushion . . . you *pay* for cushion. Do you get 100 cents' worth for every dollar you spend? *Only* if the roll you buy is a Goodrich "Vulcalock."

The Goodrich "Vulcalock" is the *only* roll that gives you 100% cushion right down to the metal core. All other makes have a hard rubber base that reduces their cushion and their life . . . often by as much as 25%.

For example, take a hard rubber base roll with a 1" cover. ¾" of the cover is cushion rubber, ¼" hard rubber . . . *dead* rubber. This hard rubber acts merely as a binder to hold the outer layer of cushion rubber to the metal core. It is a manufacturer's compromise for which *you* pay.

You pay for waste cushion when you buy a hard rubber base roll. You pay again when it's time to re-cover. The metal core must be re-rough-threaded . . . *ground down*. Rubber must replace the metal to bring the roll up to the proper diameter. This extra rubber, of course, costs money.

By the "Vulcalock" method, the rubber cover is bonded *directly* to the metal core with an adhesion in excess of 500 lbs. to the square inch; practically an integral union.

When you order a "Vulcalock" roll, you can be sure that the rubber formula has not been tampered with for the sake of effecting a vulcanization of two different rubbers at the same time. The single rubber used in a "Vulcalock" roll can be compounded exactly to your individual requirements.

Literature describing the "Vulcalock" method in greater detail mailed on request . . . quotations on specific jobs submitted without obligation. Address your inquiries to The B. F. Goodrich Rubber Co., (Est. 1870) Akron, Ohio.

SECTION OF A HARD RUBBER BASE ROLL. *The hard rubber is dead rubber . . . valueless as a cushion. Since it is about ¼" thick, this dead base represents 25% waste in a 1" cover.*

B. F. Goodrich

VULCALOCK PAPER MILL ROLLS

At your Service

Top Illustration

Warpside view of new felt loom now in operation in our plant.

Lower Illustration

View of head motion end of the loom.

THE LARGEST FELT LOOM BUILT

For many years we have been offering you the highest quality paper machine FELTS available. Now, in addition, we offer you the largest size endless FELTS made.

We can furnish endless FELTS up to 100 feet in length from this new, improved loom. Our entire organization is ready to help you solve your FELT problems. Ask us.

The Waterbury Felt Co.

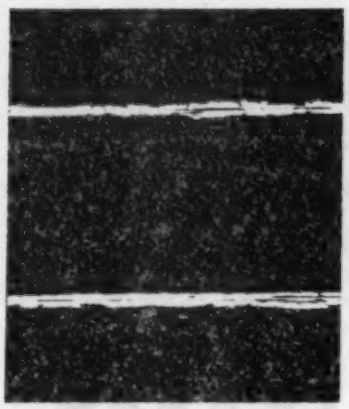
SKANEATELES FALLS, N. Y.

DO *YOUR* SCREEN PLATES

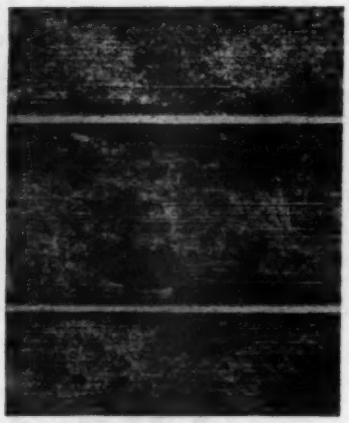
——LOSE SLOT ACCURACY?

——GET DIRTY?

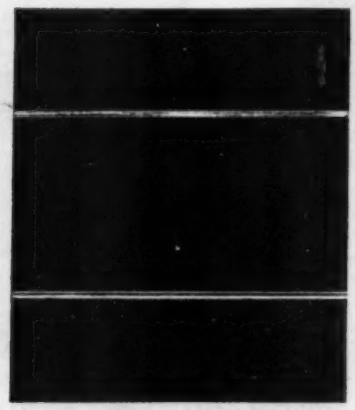
——WEAR QUICKLY?



Ordinary bronze screen plate after 10 months' service (magnified 5 diameters). This plate was recut twice. Note ragged edges, widening of slots and roughness of surface.



Ordinary bronze screen plate after 3 months' service (magnified 5 diameters). Note rounding of slot edges (indicated by darker areas), and widening of slot.



Crodon-plated bronze screen plate after 24 months' service (magnified 5 diameters). Note complete preservation of slot accuracy, absence of wear of slot edges and smoothness of surface.

INSURE THEIR USEFUL LIFE · · · · · ·

USE CRODON

The trade-mark CRODON assures the best in chromium plate.

Write for further information.

Chromium Corporation of America

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The Chrome Plate

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187 EAST BECHER ST.
MILWAUKEE, WIS.

Member of Supply & Equipment Section — American Paper & Pulp Association

The Newsprint Debacle

NEWSPRINT prices did a tailspin in the month of September.

It was not surprising to many people. In fact, about all that the chroniclers of news in the papers do nowadays is to record tailspins done in the various divisions of the industry.

However, this latest nose dive taken by newsprint is a mighty costly one. Price Brothers Company, Ltd., of Canada, made the first open reduction when it announced a cut from $53 delivered to $47.50 per ton. This was followed, on September 22, by the quotation by the International Paper Company of $46 delivered. However, the new price schedule provides a $1.00 a ton allowance at certain specified ports, including New York and Chicago, at which the International delivers paper by boat in cargo lots.

In addition, it is of especial interest to note the offer of the International Paper Company to make the new low price retroactive to June 1 of this year for all customers who sign the amendment to the contract, providing for the new low price, and extending the contract through 1937.

The New York Times of September 23 states that further cuts in newsprint prices are to be expected, and the probability is that the lowest prices for newsprint have not been seen yet. What this latest tailspin will do to the paper industry ought to be of interest to our readers.

In 1931, Canada and the United States turned out 3,378,272 tons of newsprint. This year, the decline in volume consumption has been running on the average about 12½ per cent less, indicating a total consumption this year of approximately 3,000,000 tons. A $7.00 a ton decline means that $21,000,000 in income is lost to the Canadian and United States newsprint mills, of which $7,000,000 will represent the shrinkage in income to the United States mills, and $14,000,000 the lost revenue to the Canadian producers.

It is worth while noting that when the cut in tonnage from $62 to $53 was made some eighteen months ago, one of the reasons alleged was that the cut in price would probably stimulate consumption.

The cut in gross revenue of the huge amount of $50,000,000 annually has come to pass without checking in the least the decline in newsprint consumption.

Decreases are the hall mark of the paper industry. Decreased tonnages, declines in prices, and decreased revenue reduces income and creates deficits. The only increase which the latest decrease in revenue in the newsprint industry will occasion is the increase in receiverships and reorganizations.

Price Brothers Company, Ltd., was forced to pass its bond interest, but is operating under suspended interest payment overhead. Minnesota and Ontario Paper Company, a big newsprint producer, is operating under a receiver. Abitibi is in receivership and shaping up financially to garner its quota of news tonnage based on a drastic reduction of costs.

International Paper Company alone of the big operators has not been forced to reorganize its capital structure. But even on a basis of the higher prevailing prices, it has been in the red all this year. For the first six months, it reported a loss of $2,255,803.00. Now, with the drastic reduction of $7.00 per ton in the newsprint division, plus the money to be paid out on the new contracts made retroactive to June 1 of this year, plus the drastic reductions made during the third quarter in the prices of all the rest of these products, the trade is wondering whether or not this im-

portant company can long escape such reorganization.

The newsprint debacle has a far-reaching effect. Every newsprint mill outside of International will probably be forced into the revision of its capital structures either through receivership or bankruptcy, but the plants, the mills, the water powers and the wood remain, and the brains of the men to operate under these reorganized financial structures, will introduce a new and more vicious competitive era than anything the newsprint industry has been called upon so far to face.

We are not pessimists, but we can understand facts and figures when they are plainly before us as is the present deplorable situation in the newsprint industry.

A Century of Progress and Paper

DURING the summer season, the attendance of visitors at A Century of Progress exhibition grounds in Chicago has approximated 30,000 per week. Some of the amusement features are now operating, and the buildings thus far completed are open to the public.

Colonel Bell, head of the division of industrial sciences, presented some interesting facts and figures recently when the management of A Century of Progress was host to the Business Editors Association of Chicago. He stated that the industrial science division had set as an objective for exhibits, the amount of $6,000,000. To date, sales of space in that division total $4,143,915, which is indicative of the response industry has made to this marvelous opportunity.

In addition to those contracting for space in the various exhibit halls, ten large corporations or associations have signed contracts for the erection of special buildings or structures to cost millions of dollars. Work on many of these buildings is now under way, and the character of construction is such that they will be completed in a very short time.

To one interested in and familiar with paper and paper products, the prominence of this material in the construction of buildings and exhibits at A Century of Progress is most remarkable. Many of the buildings are made largely of building board on light steel framework. The dioramas, which will be used by many exhibitors to portray historical facts or to picture the use of certain products, display many kinds of paperboard and paper. Some of the models on exhibition in the administration building are made of paper.

There is perhaps no commodity that is more generally used by everybody than paper. And while it cannot be considered as essential as food, it has come to be regarded as a universal necessity. How could man get along without it? The contribution of paper to the progress of the world benefits nearly everyone, but is given little or no thought by the majority.

It is said that there may be some equipment now in use that was on exhibition at the World's Columbian Exposition held in Chicago in 1893; some of these exhibits were known to be operating only a few years ago.

It is hoped that the paper industry, a field where science and research have contributed so much to the progress, comfort and convenience of humanity, will be represented at the international exhibition next summer; for, if not, it will have missed a golden opportunity to take its place in the sun—to present and acknowledge its accomplishments during the past forty years, and to write its signature in the world's book of scientific drama.

Progress

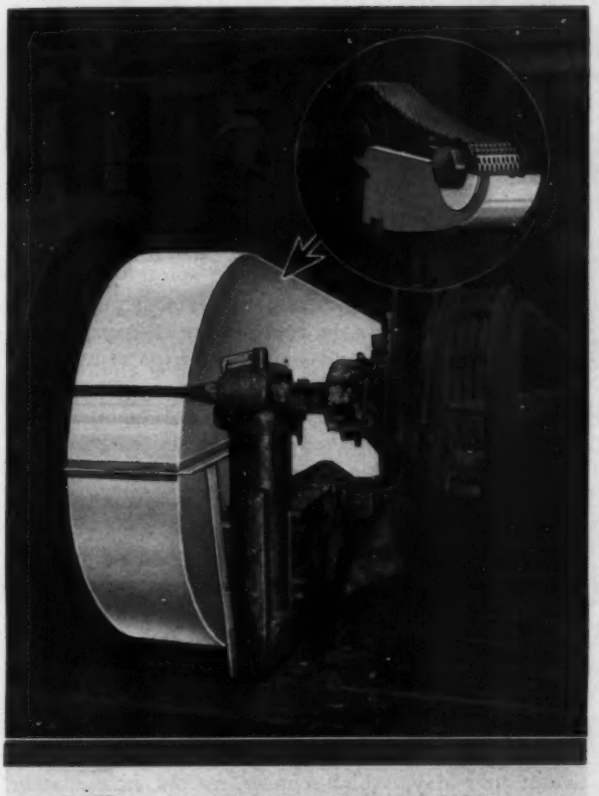
THE volume of business in most lines of activity has been far from satisfying during the past few years. At the very outset of this economic shake-up, and in the interim, some firms put into effect a retrenchment program, a program of watchful waiting pending a turn for the better. Some of these firms, out of sheer necessity, are practicing rigid economies and are attempting to hold the business trench they may have gained through the period of business prosperity when advancing was comparatively easy. Others have retreated from the battleground entirely. They could not, or would not, stand the gaff. There is still another group that may have been forced to retrench, but which has not been watchfully waiting, nor has it retreated; it has been preparing and in some cases actually putting into effect a new offensive with a vigor that is astonishing. Old products have been improved; new products have been developed; new sales plans have been promoted; and other plans have been activated to turn apparent routs into victory in some cases, and in others, to make the going even more smooth.

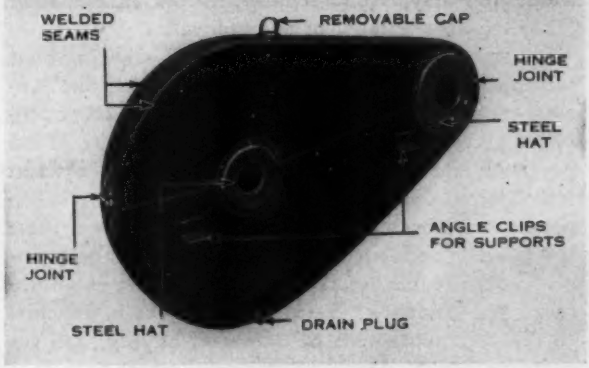
Anyone connected with the pulp and paper field knows how these thoughts apply to this business, and also appreciates, for the most part, that pulp and paper mill purchases during the past few years have been kept at a minimum.

The equipment manufacturers who are largely dependent upon the functioning of pulp and paper mills for their sustenance, are to be congratulated for the courage they have manifested and for the efforts they have made in promoting their individual activities during this unusual period of economic stress.

Read the article describing recent equipment developments in this issue. It will give, in a small way, the progress that some of these firms have made, not only for their individual benefit, but for the benefit of the pulp and paper industry at large.

LINK-BELT—the Drive that has Served BEST!





This improved Link-Belt Double Hat and Washer Type Casing prevents leakage of oil.

THERE has never been any question about the long life and high efficiency of the Link-Belt Silent Chain Drive. Installations made 15, 20 and up to 30 years ago are still in active service transmitting power positively at the initial efficiency of 98.2%—proof of the worth of the investment.

In the past, however, some paper mills experienced leakage of oil through the shaft seals in the casing. The improved Double Hat and Washer Type Casing absolutely keeps the oil in, under all operating conditions. The result is an ideal drive.

Another important factor is this—Link-Belt Silent Chain Drives stand up; there are no costly replacements at frequent intervals as are required with "V" and flat belt type drives.

Link-Belt Silent Chain is the efficient, positive power transmission that has served the paper industry for years. The improved casing now assures an added advantage. Let us tell you more about this casing.

Link-Belt Silent Chain Drives are made in sizes up to 1000 H.P. and over, and drives ½ to 60 H.P. are available from distributors' stocks. Send for Data Book No. 125, and Stock List No. 725.

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LINK-BELT

4631

SILENT CHAIN DRIVES

CURRENT THOUGHT

Five-Day Week a Solution of Unemployment

By WILLIAM SIBLEY

LAST July President Hoover advocated the "furlough plan" of employment for all federal employes, a plan which called for a five-day week on the part of all those on the government payroll. In favoring this plan, the President virtually suggested a similar course to all large employers of labor as a means for alleviating, in some measure, the acute unemployment problem.

The suggestion of the five-day week is not new. There has been a definite trend in that direction for at least two decades, with pronounced acceleration during the past few years. Even in normal times, many employers were seriously considering the adoption of the short week as a means for meeting technological unemployment, which is the displacement of men by machines. Today, with the unemployment problem far more serious than at any time within the memory of business executives, and with little prospect of approximating complete recovery during the approaching winter, here is a plan worthy of consideration by every manufacturer.

Examples are not wanting as to just how the short-hour, short-week plan works. The Kellogg Company, for instance, changed from three eight-hour shifts to four six-hour shifts as long ago as December, 1930. That change increased employment by one-third, and is said to have resulted in both an increased production schedule and a decided saving in overhead.

Here's another: When faced with the necessity for curtailing operations, one of the Standard Oil Company's plants (New Jersey) rearranged its time schedule from a 48-hour to a 40-hour week. This change eliminated the necessity for a single dismissal, and the results from the standpoint of production and overhead were so gratifying that the management of this one plant has decided to make five days, or its equivalent in hours, the normal working week throughout its entire personnel, both salaried and wage earning.

The chemist, the physicist, and the mechanical engineer have done much to add to the ranks of the unemployed. The substitution of improved mechanical means or new materials has invariably led to a decrease in the amount of labor necessary for fabrication. Nor is there any reason to expect that such substitution will cease at this time. On the contrary, it will continue, with the result that technological unemployment will presently become a semi-perpetual problem for all manufacturers.

In spite of all the glorification that has been visited upon American industry, it should not be considered perfect. The great majority of plants (by no means leaving aside the paper industry) are still far behind the leaders from the standpoint of labor-saving equipment. Indeed more than half the machinery now being used by papermakers could well be adjudged obsolete, at least in comparison with the modern equipment that is now available.

Just as soon as business begins to right itself, many of these obsolete machines will be replaced. Necessarily so, since their continuance would spell utter failure to the firm that operates them. This machine replacement will, in itself, serve to cause technological unemployment, and so far as now may be seen, the only way to meet this unemployment problem is to shorten the hours, or the number of days, in the working schedule. And since the period of machine replacement will be the period of recovery from our three-year depression, any plan that will maintain and expand our economic activity becomes all the more imperative.

Taking all manufacturing industries as a whole, the nominal average of working hours per week is about 47.8, or just slightly below the eight hours a day for six days in the week. At the present time, many plants are working on a drastically reduced schedule. Some are operating only two or three days a week. A reduction in the nominal working time in such plants would not, of course, help solve the unemployment problem. But there yet remain many plants wherein the working schedule could be shortened to a six-hour day, which change would immediately absorb a large number of unemployed.

Wherever such a rearrangement of working-hour schedule can be made, it deserves most serious consideration, not only from the standpoint of labor provision to people now unemployed, but also from the psychological reaction such renewed employment would have upon the several communities. When people are working, even though short hours, there is renewed confidence, revived hope. And the greatest need that lies before us today is the re-establishment of confidence. Faith in the future is essential to the commencement of universal buying, and the carrying out of new undertakings, whether it be a bungalow or a boulevard.

It is for this reason, as well as the direct provision of labor to unemployed, that we should all be interested in shortening hours and lengthening payrolls. Not only would it pay the paper industry to do so, in direct efficiency, but in the indirect though equally large benefit that comes from the re-establishment of confidence.

ONLY 7 OF 111 PUMPS REQUIRE REPAIR PARTS

HERE'S A 3-YEAR service record made by one type of Goulds Centrifugal Pumps . . . a type which probably operates under as severe conditions as any large class of industrial pumps.

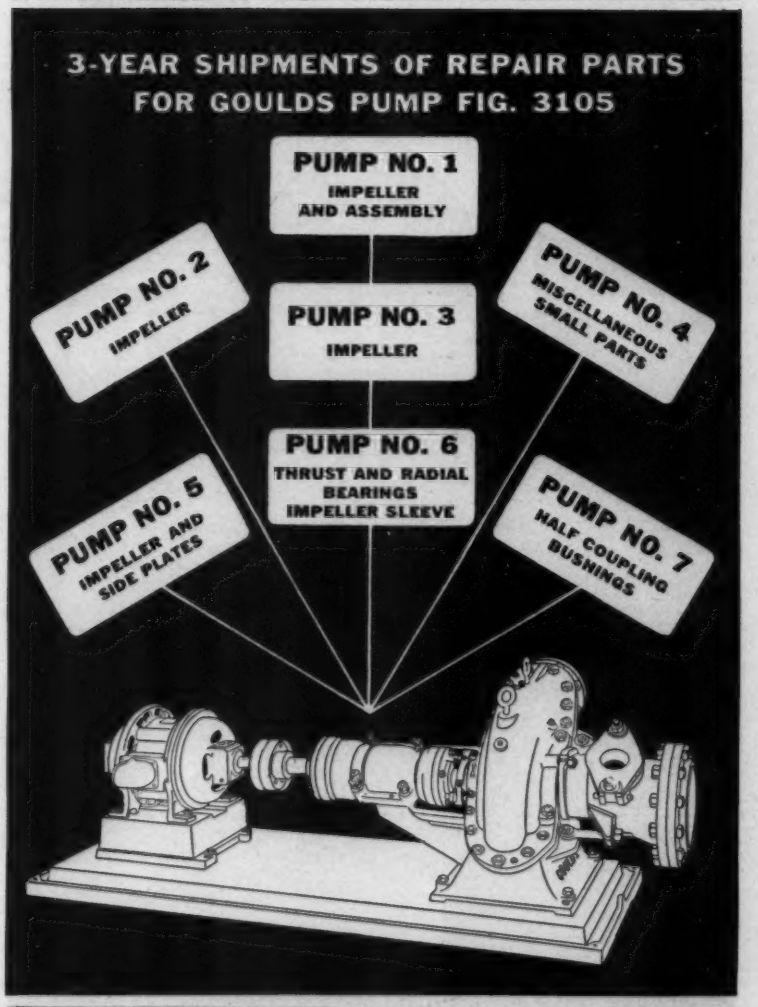
These are paper stock pumps, and they handle heavy, stringy stock . . . 3% sulphate, 4% kraft, 5% to 6% sulphite, groundwood and cotton linters pulp!

To get the full importance of this record, bear in mind that these pumps are under a 24-hour, six-day-a-week load in leading mills from Maine to Mexico, from Louisiana to Wisconsin. Consider that the total cost of the repair parts, distributed over the 111 pumps, averaged as low as 85.11 per pump.

What stronger proof could you ask of the dependability and economy of this pump? Add to this, its 3 principal, exclusive features: (1) no air-binding, (2) no clogging and (3) efficient use of power.

This pump fulfills the purpose of Goulds Research which (in spite of the times) is maintained in full at a weekly cost of over $1500. That purpose is . . . better and better performance for Goulds Pumps.

Write for Bulletin 206 and report on "Pumping High Density Stock." Goulds Pumps, Inc., Seneca Falls, N. Y. Branch offices and agents in principal cities. World's largest makers of pumps exclusively.



$1500 A WEEK FOR BETTER AND BETTER PERFORMANCE

GOULDS PUMPS

Now let's get our feet

off the ice . . . *and sell*

"The job is to get into motion before another thirty days have passed . . . . . ."

from Report of A. W. Robertson, Chairman
Committee on Industrial Rehabilitation

A call for action . . . action by those who still know how to sell

THIS Committee on Industrial Rehabilitation is getting busy without delay. It means to act, and act promptly. Sub-committees are now being formed in every Federal Reserve District. Perhaps they have already called on you.

They're going to create buyers and thereby create opportunities for sellers. They're going to call on plant after plant in every industry. They're going to sell the idea to industrial managements that modern equipment installed now will improve any company's price position, thus enabling it to compete for business as consumer demand picks up. They are going to show that it is to industry's own self interest to modernize now because equipment can be purchased and installed today for far less than its future cost will be.

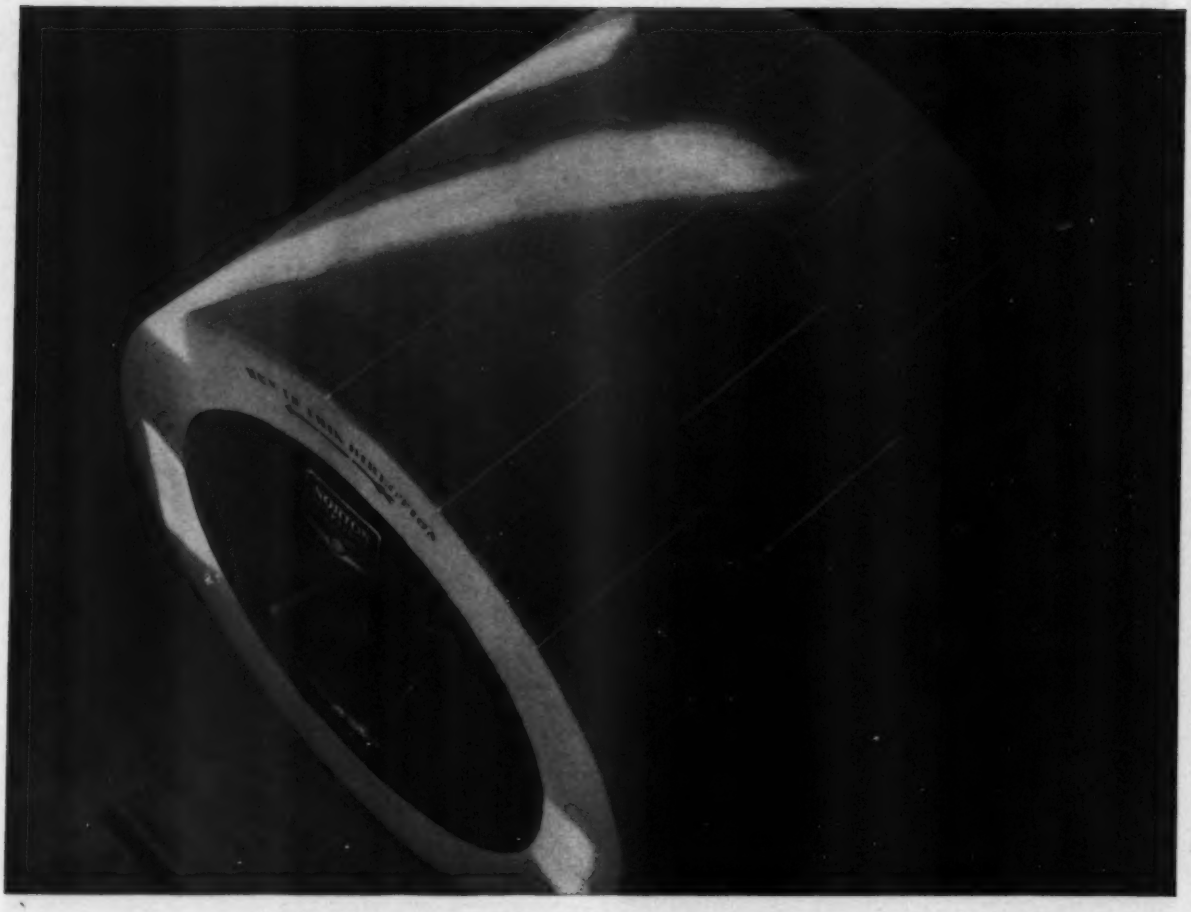
It is conservatively estimated that every dollar spent or pledged on this "capital goods" replacement program, will put several other dollars to work paying wages and purchasing materials throughout other industries indirectly affected by the production and movement of basic "capital goods." Here is a sort of business revival snowball, which, if it can be started rolling now is absolutely certain to gather weight and momentum as it goes.

Here is the time and place for action by those who haven't forgotten how to sell. The Committee on Industrial Rehabilitation can't do all the work. It can create interest, arouse desires, and perhaps help solve the prospective buyer's financial problem. It can sell an idea but it can't and won't actually sell your equipment for you. That's your job!

Send your salesmen out with this picture in mind. Prepare your advertising with the same idea in view and send it out ahead to open the way for the salesman. Let advertising and direct selling do the job together—as they should. Advertising will take your sales message to the buying power of industry, to the people who are being urged to buy, by this powerful Committee on Industrial Rehabilitation. It is up to you to show them how your equipment will modernize their plants, cut their production costs, create more salable products, and better prepare them to profit by the upturn in business.

You don't have to commit yourself to advertising for a year, or even six months. You can advertise for the balance of 1932, and then judge the future on the basis of the outlook on January first.

Too many sellers have had cold feet too long. They've quit trying to sell because selling is no longer as easy as it was in the good old days. Let's get those feet off the ice . . . . . and sell!



Valuable experience is obtained through pioneering. Pulpstone manufacturing was no exception.

From the two classes of abrasives available, an especially treated silicon carbide (Crystolon) was determined upon for the Norton Pulpstone. Reasons: Its lower coefficient of expansion and the method of bonding silicon carbide result in a stone of greater strength—the strength that is essential under extreme conditions in the pulp-wood grinder.

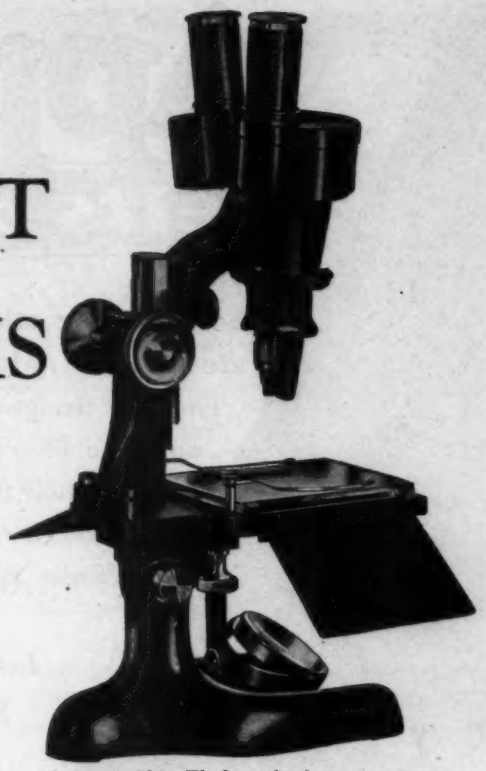
From many materials available and tried a special composition babbit won out as a filler for the joints between segments. It wears down at the same speed as the stone wears. It requires no undercutting as the many users already know. It does not dissolve under severe conditions.

The Norton Pulpstone is built to withstand abnormal conditions.

NORTON COMPANY
Worcester, Mass.

NORTON PULPSTONE

SEE THE OBJECT AS IT REALLY IS



Microscopic KA—The binocular feature permits use of both eyes and eliminates eye strain

THE Greenough Type Binocular Microscope brings you the object as it really is—right side up and not *inverted or reversed*. Furthermore, a decided stereoscopic effect adds the third dimension, a feature that more than proves its worth in fiber study.

A further advantage of the binocular feature is that it makes prolonged observation much easier on the eyes. The long free working distance of the objectives permits ease of specimen manipulation.

Microscope AA For routine inspection work in the mill

For fiber analysis, the KA has a range of magnifications from 10X to 105X, well within the range of magnifications designated by TAPPI for this type of work. It readily enables its user to judge the fiber and make rough quantitative and qualitative determinations. For the examinations of the finished product, the Greenough Type likewise proves its worth. Imperfections, such as dirt, spots, etc., can be readily studied and their nature determined. Rosin, iron particles, rubber, etc., are quickly identified.

Write for complete details.

BAUSCH & LOMB OPTICAL COMPANY
630 St. Paul Street - - - Rochester, New York

Please send me complete information on:
KA Microscope..... AA Microscope.....

Name .....

Company..... *Title*.....

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BAUSCH & LOMB OPTICAL COMPANY

630 St. Paul Street — *Bausch and Lomb makes its own optical glass. Only B & L glass meets B & L standards.* — Rochester, New York

MICROSCOPES : TELESCOPES : BINOCULARS : SPECTACLE LENSES AND FRAMES : OPHTHALMIC APPARATUS : SCIENTIFIC INSTRUMENTS :

Appleton
Felts and Jackets

The exacting conditions under which Appleton Felts are made are only half the story of Appleton Felts. They are designed right and as quality products ought to be—controlled in production, every step of their manufacture—to assure quality and service to users—made to meet the definite requirements of your mill.

Let us help you solve your felt problems

REG. U.S. TRADE MARK PAT. OFF.

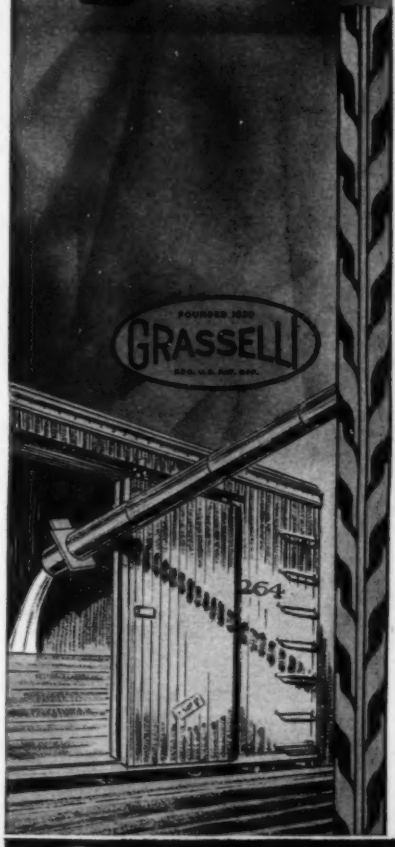
APPLETON WOOLEN MILLS
Appleton, Wisconsin

GRASSELLI

SALT CAKE

For

those Manufacturers of high grade Kraft who are Satisfied with no less than Ultimate Quality



CONSTANTLY on the alert for better control of sulphate pulping operations, such producers will find in GRASSELLI SALT CAKE the end of their search for a grade that exactly fulfills their critical requirements.

GRASSELLI GRADE is *not* just another Salt Cake. It is the result of many years of experience in producing a salt cake *particularly adapted* to your Kraft needs.

Other Grasselli Chemicals for Paper Manufacturers:

Acetate of Lead	C. P. Ammonium Hydroxide
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Aqua Ammonia	C. P. Sulphuric Acid
Barium Carbonate	Muriatic Acid
Barium Chloride	Silicate of Soda
Barium Sulphate (Blanc Fixe)	Soda Ash
Bleach	Sulphuric Acid
Caustic Soda	Tri-Sodium Phosphate

Our Research Department may be of help in solving some of your problems. This service is available to you. Write, wire or phone any of our branches below.

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GRASSELLI GRADE

A Standard Held High for 93 Years

100 INCHES WIDE - -

yet a hair was too much to vary!

Three paper machines 100 inches wide . . . larger than any yet built for the finest tissue production . . . not a hair's variation in thickness to occur anywhere in the sheet.

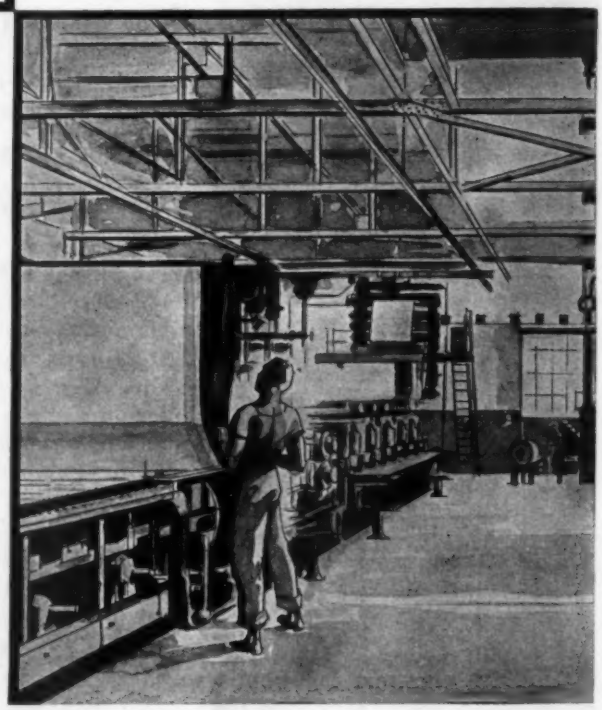
Smith & Winchester Fourdriniers were designed—wet ends, Fourdriniers, press rolls, dryers, reels, winders. Even before installation, Smith & Winchester's long experience building fine paper machines allowed the job to be guaranteed complete.

Two years ago, installed beside another S & W Fourdrinier—today, turning out the finest grade of tissue sheet a hundred inches wide with no variation in thickness the entire width.

Consult Smith & Winchester engineers when the question arises of rebuilding an old machine or adding a new one to meet today's competitive prices on fine paper—condenser, cigarette, tissues, books, bonds, ledgers. The longest experience in the field with fine paper-making machinery is at your service without obligation.

A book has been prepared for interested executives that shows the facilities available at Smith & Winchester and explains just what is meant by S & W engineering service. A request on your letterhead will bring a copy.—Ask for "A Century of Pioneering in the Paper Industry."

MAKERS: *Fourdriniers; cylinder and wet machines; bindersboard machines; paper-bag machines; undercut trimmers; Rainstorm shower pipes; reels and winders; slitters and calenders; rolls (bronze and wood); Jordans and Jordan fillings; stuff and fan pumps; castings from our own or customers' patterns.*



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The SMITH & WINCHESTER *Manufacturing Company*

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THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL

Bleaching Southern Kraft

Technical and economic aspects in the production of white papers

By R. H. STEVENS

THE present demoralized state of the kraft paper market is a fitting retribution for the short-sightedness of the leaders of the southern industry. It fulfills predictions made three years ago by members of the staff of the Paper Section of the Forest Products Laboratory. On a visit to Madison in the summer of 1929, the writer was told that the one-sided development of the paper industry, which even then prevailed, could not but end in disaster. It was argued that by restricting manufacture to a single line of products for the disposal of which it was necessary to invade the natural markets of other papermaking sections, while at the same time being very largely dependent upon these other sections for all other classes of paper, the South was in an unbalanced, economic condition as to the production and consumption of paper.

The writer fully agreed with this viewpoint and desired to see diversification of the southern paper industry. Unfortunately, while times were good, manufacturers could see no need for diversification. And when bonanza days were over and the average market price fell below the cost of production, they felt unable to finance the development work which must precede full-scale manufacture of products for the first time. But for this short-sighted policy, the South as a whole might even today be assuming the leadership in the paper world to which its natural advantages entitle it. Only lack of bleaching prevents the entry of the southern pine fiber into many fields in which it might soon gain preëminence.

Unfortunately, papermaking has been so hemmed in by hidebound tradition that its development along lines that seem logical and obvious, especially after they have been brought to success, are frequently overlooked or even scoffed at by those who should know better. The history of the introduction of the sulphate process to America and its first application to southern pine is a case in point. And the development of a bleached pulp industry has been retarded more by this attitude of mind than by any technical difficulties. Bleached sulphate pulp was made from southern pine more than twenty years ago in a full mill scale experiment[1] and has been made every day for the past several years at one of the book paper mills of the South. In view of these facts, it really seems ridiculous that the southern paper industry should persist in refusing to consider this logical line of development.

Well-cooked sulphate pulp exceeds sulphite in alpha-cellulose content and freedom from degradation products that affect the copper number. Southern kraft pulps commonly have a cuprammonium viscosity about half that of high grade muslin rag stock, and it is possible to retain from one-half to two-thirds this viscosity figure after bleaching. These qualities, together with greater bulk and superior tearing strength, indicate the bleached southern kraft should have exceptional value in the manufacture of permanent papers of great durability and softness. When mixed with shorter-fibered stocks, such as bleached southern hardwood sulphate pulps, or even properly prepared bagasse pulp, the southern pine could be used for a large variety of cultural papers for which the South is now dependent upon other paper-producing sections.

Bleaching Methods

It has been known for years that the action of calcium hypochlorite bleach on wood pulp proceeds in two stages: The first appears to consist of an addition of chlorine to unsaturated non-cellulose compounds rendering them more susceptible to oxidation. This is then followed by an oxidizing action whereby these chlorinated colored compounds are destroyed. The Forest Products Laboratory has shown that for the chlorine addition stage it is preferable to use chlorine in water solution rather than the more costly hypochlorite.[2]

[1] R. H. Stevens, THE PAPER INDUSTRY, July, 1932, p. 299.

[2] Curran, Doughty and Bray, *Technical Association Papers*, 14,365-372 (May, 1931).

Apparently this avoids side reactions which have a weakening effect on the fiber and increase the shrinkage. These considerations are all the more important in the case of alkaline pulps since the non-cellulosic products associated with the fiber are highly colored and the chlorine demand for bleaching is greater than for sulphite.

That bleaching by preliminary chlorination did not become universal long ago was due to lack of suitable equipment. Within the past two or three years, however, rapid strides have been made in bleach engineering and there are now two well developed methods of carrying out this first stage. In one of these, liquid chlorine is passed continuously into a stream of slush pulp. After a definite period of contact, milk-of-lime is added and the hypochlorite thus formed is allowed to exhaust itself. After washing, the pulp is bleached to the desired color with calcium hypochlorite. This continuous process requires very careful regulation. The rate of chlorine feed is measured by an ingenious meter employing a silver sylphon. The ratio of chlorine to pulp is regulated by maintaining a constant rate of flow of pulp of uniform consistency. The period of contact is obtained by upward flow through a rubber lined tower of a size so proportioned to the rate of pumping as to give the required time of retention. The operator makes manual adjustments when necessary as indicated by simple chemical control tests.

The other method is a batch process. It differs from the first in that a definite quantity of liquid chlorine is weighed into an evaporator where it is volatilized and the gas delivered into a measured mass of slush pulp. The succeeding steps are similar to those of the first method in a general way, but the equipment is different. The installation cost for the continuous process is less than for the batch system and greater flexibility is claimed for it. On the other hand, the proponents of the batch system claim theirs is more fool-proof. Labor, chemicals, shrinkage, etc., should not differ much between the two systems. Both are capable of yielding bleached pulps with improved bursting strength and folding endurance as compared with the unbleached, but the tearing strength suffers to some extent. Southern pulps, however, excel in the latter quality and are superior to sulphite pulps in this respect even after bleaching. The batch process has been applied successfully in several instances; none, however, in the South as yet. The continuous process, which is the more recent development, has not yet been applied completely in full scale mill operation, though part of the equipment has been demonstrated successfully in a kraft mill making bleached specialties.

Quality Control Factors

The manufacture of bleached pulp should begin in the digester. Or, more properly speaking, in the wood room. For at least one kraft mill has come to grief by attempting to bleach pulp containing shives and dirt that should have been kept out of it. Besides clean uniform chips, a proper cooking schedule is of utmost importance. The findings of the Forest Products Laboratory as to the importance of concentration of active alkali in the digester charge when making easy bleaching pulp has been corroborated in full scale cooking experiments at one of the southern mills. The necessity for allowing sufficient time for the liquor to penetrate the chips has not, however, generally received the attention it deserves. Even for unbleached pulps, it is well worth while to maintain greater uniformity and improve the quality of the pulp by securing thorough penetration before raising the digester charge to the full cooking temperature. Forced circulation, not necessarily accompanied by indirect heating, is very beneficial. Too much reliance has been placed heretofore on digester pressure for control of cooking. It is far better to cook according to temperature, since volatile products of reaction have an influence on the pressure and may cause it to deviate from that corresponding to the temperature. Excellent time-temperature control instruments are now available and sulphate pulp mills would do well to avail themselves of them for maintaining uniform cooking.

After cooking, the washing is of utmost importance. Too many mills in the South are careless about the character of the water used for washing and the completeness of the removal of black liquor. In these days of cut-throat competition on coarse product, it is often cheaper to neutralize residual liquor with low-cost acid than to install additional diffusers. Once they attempt to make white papers, however, they will find the washing will require greater care than has been realized. Most of the mills of the South have ample supplies of soft water, but some of them will have to install filters before they start bleaching.

For a long time sulphate pulp men have been expressing dissatisfaction with the diffuser method of washing on account of troublesome channeling which sometimes occurs. To date, however, nothing has been proposed which does not seem to involve other difficulties. The industry awaits the invention of the device that will accomplish thorough washing with a minimum of dilution.

Bleached pulps require more careful screening than is commonly practiced in most of the southern mills. The bronze color of good kraft pulp can hide a multitude of sins, but snow-white spotlessness demands eternal vigilance. Sulphate pulp that has passed through the centrifugal screens with ⅛-inch diameter perforations frequently used for southern kraft may require careful screening on fine cut plates before bleaching.

Economic Advantages of the South

Pulp that has been properly cooked, washed and screened can be bleached with around five per cent of available chlorine (using the chlorination first step) and not more than four to six per cent shrinkage. The cost, including all items, such as chemicals, power and steam, labor, superintendence, mill supplies, insurance, depreciation, taxes, etc., should not exceed $12.00 a ton of unbleached pulp. The cost of the latter should not be more than $20.00 a ton, even with the extra care necessary in its preparation. It should be possible, therefore, to manufacture high quality bleached pulp, in slush form, for $33.00 a ton or less, including shrinkage. Once the southern mills start bleaching, however, chlorine production will be undertaken in the South and this cost will be lower.

The natural advantages of the South referred to above include low cost of materials and labor, mild winter climate obviating necessity for heating mill

buildings, and a large potential home market for white paper. Pulpwood costs in the South are now as low as $2.50 a cord, peeled, f.o.b. mill, and probably do not exceed $4.00 in the less fortunate mills. The cord yields around 2,500 lb., oven-dry weight, of chips containing from 1,000 to 1,200 lb. of alpha-cellulose.[3] Wages in the South have always been lower than in other sections and most of the mills have cut wages during the past year from ten to thirty per cent. Owing to the mild winter climate, living costs are proportionately lower than in regions where rigorous winters prevail. The South consumes around one and one-quarter million tons of cultural papers yearly, less than one-fifth of which is produced in this region. With suitable bleached pulp available at low cost, it should be possible to supply this home market profitably instead of continuing to export a coarse product to other sections at prices below the cost of production. It may sound like a fantastic dream, but the writer believes it is possible to supply southern printing plants with paper made from an all-chemical pulp at prices no greater than they are now paying for standard newsprint. All that is lacking is for some southern paper manufacturer to have the courage and vision to undertake it.

[3] C. E. Curran, "Pulpwood Evaluations," Paper presented before joint meeting of Pulpwood Department of A.P.P.A. and Fibrous Raw Materials Committee of T.A.P.P.I., February 15, 1932.

Screw Presses in the Pulp and Paper Industry

A description of several types of screw presses in use in Europe and a discussion of their practical advantages to the industry

By CURT WEIL

THE idea of dewatering fibrous materials by squeezing without wet presses, or similar machines, received impetus in Germany during the War, and finally crystallized itself into several designs of machines designated as screw presses. Briefly, a screw press consists of a housing, an inner perforated shell or screen, and a specially designed internal screw.

An inlet opening for the stock is built into the top part of the housing at the drive end and permits gravity flow to the screw. The pitch of the screw tapers from the inlet to the discharge end so that the screw during operation acts over its entire length as means of conveying and pressing the stock. The pressure exerted upon the stock increases continuously from the inlet to the discharge. A special gate for regulating the consistency is provided at the discharge end of the housing. This gate is counterbalanced by means of a lever and weights, and automatically operates in accordance with the amount of stock passing through the machine.

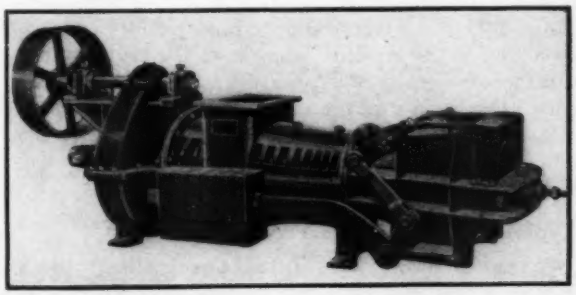

Fig. 1—Thune screw press

The screw shaft is supported within the perforated inner shell in such a way that at no point does the screw come in contact with the shell. The liquid extracted from the stock by the screw is expelled through the perforations into the area between the machine housing and the inner shell, from which it is discharged from the machine.

Final density of discharged stock is dependent upon rate of stock flow to machine and also upon its original consistency and freeness at the time of entrance. Under favorable conditions, a density of 45 to 50 and even 60 per cent may be obtained, although it is not ordinarily recommended to press the pulp so hard. If stock is to be stored, it is suggested that the density not exceed 25 to 30 per cent. Otherwise, pulp knots will build up in the stock and make it next to impossible to satisfactorily separate them by beating or jordaning. The higher densities are recommended only when the stock is to be used immediately after pressing.

Description of Various Types

There are three types of screw presses on the European market at present, namely: Thune, Voith, and Mosebach.

The Thune Screw Press (Figure 1) is of extremely rugged construction to withstand hard use. The screen lining or perforated inner shell is made of copper, bronze, monel metal, or acid-resisting steel, depending upon the kind of stock for which it is to be used. This shell, as well as the cast iron housing, is divided horizontally to permit easy dismantling. The housing is equipped with holes for inspection or for an occasional cleaning of the machine interior. The drive arrangement is separate from the machine and is entirely enclosed. It consists of a combined worm and spur gear arrangement which permits a direct drive from a motor or it may be belt driven.

One special feature of the Thune press, a feature controlled by the Strindlund patent, is the possible

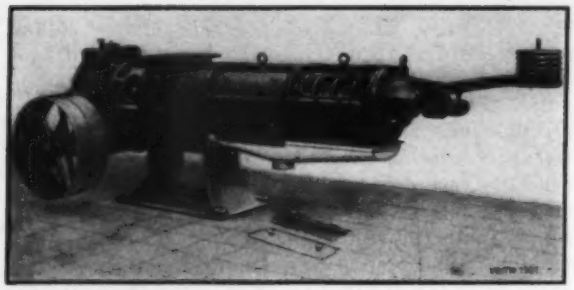

Fig. 2—Voith screw press

operation of the screw at a variable speed. This variable speed seems to impart the same effect to the screw as a forward and backward motion, and tends to prevent the coating of stock on the screen plate.

Thune presses are built for capacities up to 60 tons per 24 hours when operating on unbleached chemical pulp, and dewatering from 9 per cent to 25 per cent with about 18 hp. The capacity on bleached pulp is increased about 10 per cent.

The Voith screw press (Figure 2) is built in two types and two capacities. The screw in the type used for chemical pulp is cylindrical over its entire length, while the screw for machines operating on groundwood is divided into two sections: the first part is cylindrical; the second is conical. The power consumption of the smaller machine ranges from 7 to 14 hp., while the larger unit requires about 25 hp. The capacity of the small machine varies between 8 and 10 tons per 24 hours when operating on groundwood, and between 10 to 14 tons when operating on chemical pulp; while the capacity of the large machine is about double on groundwood and more than doubled on chemical pulp.

The Mosebach screw press (Figure 3) has several distinctive features of construction. In the first place, it is built in either single or twin units. Twin units contain two parallel screws in one housing. The screws are tapered in both designs and are housed within a perforated cylinder which is protected by a heavy exterior jacket with suitable openings for inspection. The inlet funnel is equipped with an agitating device and a perforated cylinder to permit

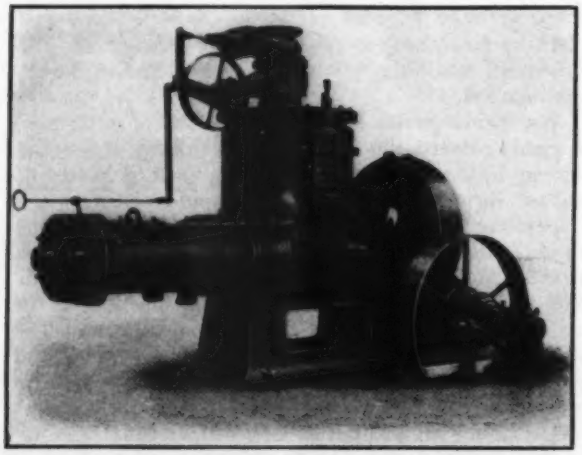

Fig. 3—Mosebach screw press

preliminary dewatering. The conical screen cylinder is provided with axial guidestrips to prevent rotation of the stock when passing from the coarse screen to the fine. The flow of the material to the press, to be dewatered, is controlled by a stop valve, while a hand-operated valve is used to regulate the discharge. Fibers carried by the white water are recovered by a straining cylinder which is inserted in the outlet pipe.

A single press on groundwood has a capacity of approximately 15 tons per day when dewatering stock from 7 per cent to 50 per cent. Such an installation requires about 6 hp. The same machine on sulphate pulp will handle 10 to 15 tons per day with 8 hp. The capacity of the twin type is 8 to 10 tons per day on groundwood and 12 to 22 tons per day on sulphite. About 8 to 10 hp. is required for operation.

Each type of machine is driven through a variable

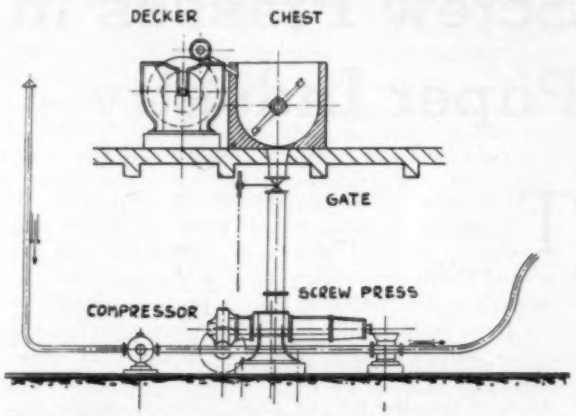

Fig. 4—Dewatering of ground wood

speed motor which gives to the machine a normal operating speed of 25 to 28 r.p.m.

If the dryness of the discharged material is too low, the preliminary dehydrator at the inlet end of the machine is put into operation. If the use of the preliminary dehydrator does not give the desired results, the speed of the screw is changed. The speed is reduced if the stock is excessively wet, and increased with less wet material. In the latter case, the preliminary dewatering of the stock would be reduced or fully shut off. A water supply pipe permits water to be added to the stock to bring it to the required percentage of dryness whenever advisable. At the same time, the dryness of the discharged stock may be decreased by increasing the clearance between the screw and screen cylinder. This operation is performed easily through an axial adjustment of the screw.

Typical Applications of Press Installations

A typical screw press installation is illustrated in Figure 4. In this installation, groundwood is being conveyed from the grinders to a decker where it is concentrated to about 6 or 7 per cent—the most suitable concentration of groundwood for dewatering by means of a screw press. The stock from the decker is discharged into a chest equipped with an agitator, and from it into the screw press where it is thickened to 30 to 45 per cent. The discharged pulp from the screw press falls into a feeding device, from which it is

blown by compressed air to storage or to beaters as required.

The use of screw presses in groundwood mills, where the water level fluctuates, is of special advantage. When the water level is high, it is only necessary to place more presses in operation to handle the possible increase in production.

The application of a screw press in a waste paper pulping process, patented by Kuhn and known as the

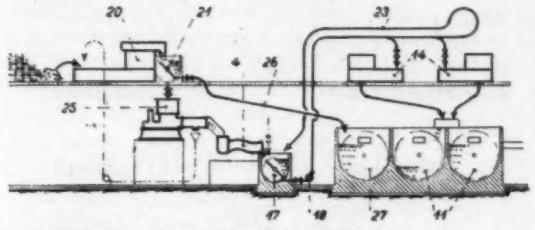

Fig. 5—Kuhn's waste paper pulping process

Triplex System, is shown in Figure 5. This system consists of a breaker beater (20), a screw press (25), and a kneader or defiberizer (4). The breaker beater is fed with unassorted bales of waste paper which are quickly pulped and all foreign materials removed mechanically. The clean stock passes through a perforated backfall and is discharged continuously into an agitator vat from which the screw press is fed. The discharged stock drops into the kneader where it is prepared for the mixing or coloring beaters and the back-water of the screw press utilized for dilution.

In mills where a lower grade of stock is required, the stock from the agitator vat (21) may be fed direct to the machine chest for the filler, while the stock for the liner is fed to the Triplex System and from there to vat (17), then pumped to mixing beaters (14), and dumped from these beaters into machine chests (11). The system produces a clean, uniform product of remarkable strength with an accompanying saving in labor, power, and transportation.

Screw presses may also be efficiently used for the washing of fibrous material where it is desirable to recover chemicals. The advantage of such equipment for such a purpose may be more fully appreciated by a study of Figure 6, which shows an arrangement in use in a straw mill in Germany.

In this installation, the straw stock after the cooking process is completed is diluted in the digester to 7 per cent bone dry by adding hot spent liquor from a previous cook. The diluted stock is then pumped to an agitator pit from which it flows in a thoroughly mixed condition to the first screw press. Here it is pressed to 50 per cent cent air-dry, and discharged by gravity into a pit in which it is diluted with hot water to 7 per cent density. This diluted stock flows to another agitator tank from which it is delivered to the second stage screw press. The discharged stock from the second screw press is sufficiently free from chemical liquors so that when it is diluted with clean hot water it may be pumped to storage.

The black liquor from the first press is evaporated while the liquor from the second press is used on subsequent cooks with the fresh liquor.

The liquor to be evaporated is passed through an Allokris filter (Figure 7) for the purpose of removing all fibers from the liquor that might tend to slow down evaporation. This filter has been developed recently in Sweden and is entirely different in design from the filters commonly used. It consists of a cast iron tank with a monel metal removable strainer attached to a wrought iron frame. A drive shaft, bearing eccentric cams, actuates a lever with rubber padded ends. This action to the lever gently squeezes it against the back side of the strainer, the liquor entering from the opposite side, and then through the action of four spiral springs withdraws it from the strainer at a rate of ten times per minute. The liquor passing through the screen leaves a layer of pulp upon it, which, due to the reciprocating movement and the inclined position of the strainer section, constantly slides downward or falls off into a large chamber. This chamber is equipped with an automatic exhaust valve through which the contents are emptied. The unit, built to handle black liquor from approximately 83 tons of pulp daily and operated with a ½ hp. motor, is particularly adaptable to soda and sulphate mills which use diffusers or open pans for washing. It is also used for the recovery of fibers in white water.

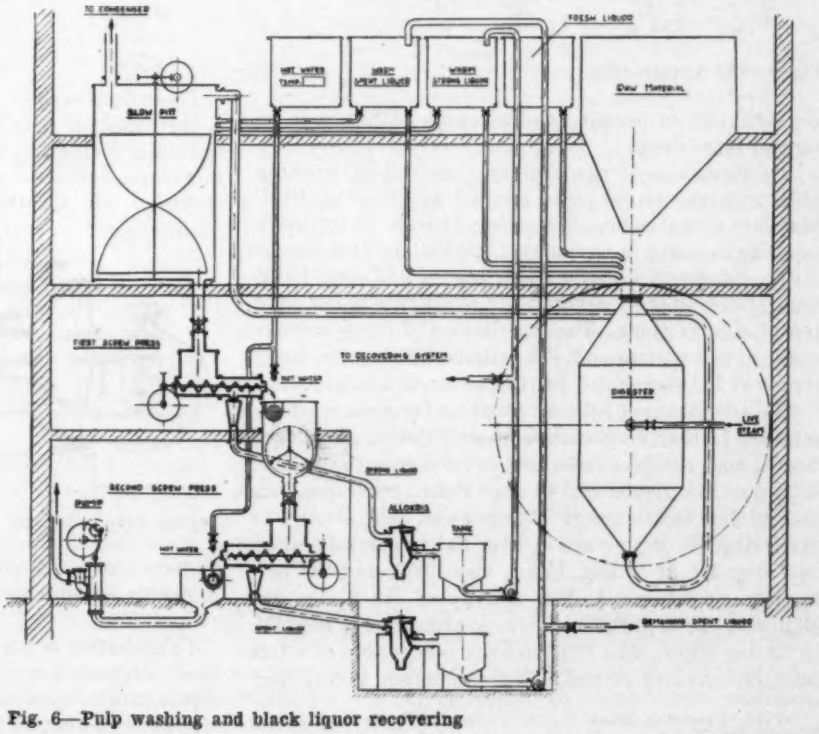

Fig. 6—Pulp washing and black liquor recovering

Screw presses when used for pulp washing should be located as close as possible to the digester or rotary department. Such a location permits the use of comparatively short connecting pipes, and allows the thinned stock from the digesters to be delivered to the presses at a temperature of 150 deg. to 176 deg. Fahr. Storage tanks for the liquor removed from the stock during pressing and utilized for diluting the cooked stock in the digesters are commonly mounted on the operating floor of the cooking department. These tanks

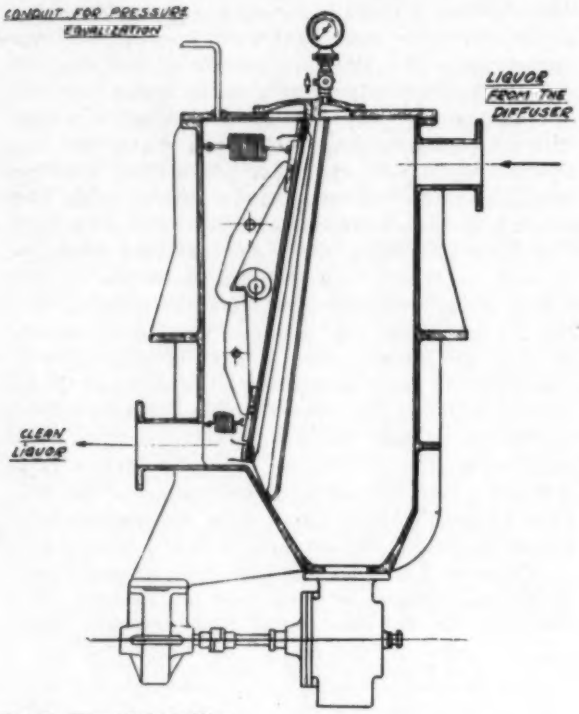

Fig. 7—The Allokris filter

are designed to permit fixed amounts of liquor to be tapped from them.

A comparison of the ordinary method of washing pulp with the screw press method as given by Prof. Mueller[1] reveals some interesting figures. In ordinary practice in a mill in Germany 2,906 gallons of 5 deg. or 6 deg. Bé. spent liquor at 131 deg. or 122 deg. Fahr. respectively were delivered for evaporation per long ton of air-dry stock. The installation of screw presses reduced this volume to 2,478 gallons of 7 deg. Bé. spent liquor at 131 deg. Fahr. per ton of air-dry pulp.

The advantages of the screw press for pulp washing may be further emphasized by calculating the quantity of water to be evaporated in each case to produce a 30 deg. Bé. liquor at 140 deg. Fahr., corresponding to a 32 deg. Bé. liquor at 59 deg. Fahr. The density of the 5 deg. Bé. liquor at 131 deg. Fahr., corresponding to 7 deg. Bé. at 59 deg. Fahr., was 1.052, and the percentage of solids 9.4. The density of the 6 deg. Bé. liquor at 122 deg. Fahr., corresponding to 7½ deg. Bé. at 59 deg. Fahr., was 1.06, and the percentage of solids 10. The density of the 7 deg. Bé. liquor at 131 deg. Fahr., corresponding to 9 deg. Bé. at 59 deg. Fahr., was 1.067, and the percentage of solids 11.8. The density of each liquor after evaporation, calculated at 59 deg. Fahr., was 129, and the percentage of solids 46.

If W denotes total quantity of water to be evaporated in gallons, Q the total quantity of liquor to be evaporated, S the density of the dilute liquor, T_1 the percentage of solids in liquor to be evaporated, and T_2 the percentage of solids in the concentrated liquor, then $W = Q \times S \left(1 - \frac{T_1}{T_2}\right)$, or:

$$W = 2906 \times 1.052 \left(1 - \frac{9.4}{46}\right) = 2432.5 \text{ gallons}$$

$$= 2906 \times 1.06 \left(1 - \frac{10}{46}\right) = 2410.8 \text{ gallons}$$

$$= 2478 \times 1.067 \left(1 - \frac{11.8}{46}\right) = 1965.7 \text{ gallons}$$

These figures show that from 445 to 467 gallons more water must be evaporated per long ton of pulp when the ordinary method of pulp washing is used in contrast to the quantity to be evaporated when the screw press is used for pulp washing.

The percentage of alkali remaining in the stock after washing depends on the consistency of the feed to the screw presses. The following figures indicate results obtained from test samples taken from stock leaving a press at 55 per cent air-dry.

Feed Consistency	*% Alkali Retained in Pulp Discharge at 55% A. D.*
4%	3.4%
6%	5.2%
8%	7.1%
10%	9.1%
12%	11.2%
14%	15.6%

These figures show that as the stock entering a press is increased in density, the higher is the percentage of retained alkali in the discharge. The loss of liquor, therefore, increases with an increase of stock consistency. On the other hand, a liquor of as high a

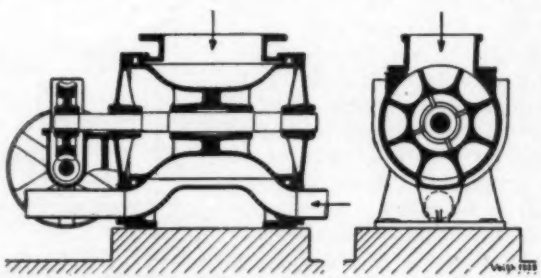

Fig. 8—Pulp feeder for air conveyor

density as is possible for practical operation is desirable because such a liquor minimizes the cost of evaporation.

In operation it has been found advantageous, as has been suggested previously, to introduce hot spent liquor into a digester at the end of a cook and to dilute the stock to about 7 or 8 per cent consistency giving a

[1]Prof. Friedrich Mueller—Die Papierfabrikation und deren Maschinen—Vol. 1.

final liquor concentration of about 8½ deg. Bé at 167 deg. to 176 deg. Fahr. Rotary boilers should be turned over several times after the introduction of thinning liquor to evenly distribute the liquor throughout the entire mass. Similar distribution of liquor is obtained in stationary digesters equipped with circulating systems by maintaining circulation for some time after the liquor has been added.

Another interesting development in conjunction with the screw press is the use of pneumatic conveyors for handling stock from the presses. Such a conveyor may be used for handling stock with a consistency as low as 25 per cent and for distances up to 3,000 feet.

A pneumatic conveyor for this purpose utilizes a

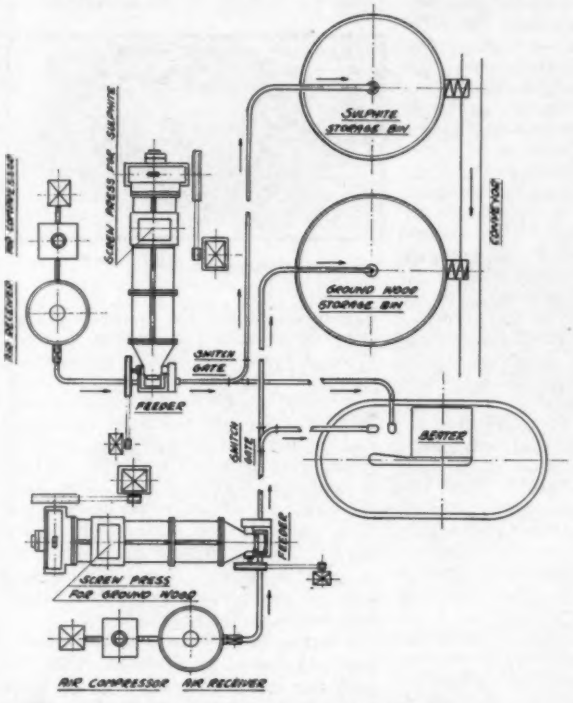

Fig. 9—General scheme of screw press application, pneumatic conveying and storage systems

feeding or apportioning device, an air compressor, and small diameter pipe lines.

The pulp feeder, in appearance, resembles somewhat the cylinder of a revolver (Figure 8). Stock entering the feeder or cylinder is moved slowly downward to a pipe line where it is ejected from the machine by high pressure air. The construction of the machine is simple, cheap and sturdy. It requires practically no maintenance.

When stock to be conveyed is taken from several machines, an apron or screw conveyor carries it to the feeder where the contents of each revolving port is discharged into the pipe section and immediately blown to its destination.

Small diameter pipes are used in the pipe section because of the high speed of stock travel. A 2½-in. line will handle 1,000 lb. of air-dry stock per hour.

The dewatered stock may be blown direct to the beaters or into storage towers or silos. A convenient and practical arrangement for mills producing paper from different grades of stock is illustrated in Figure 9. The silos may be of steel, cement, or tile construction, and are designed with slightly conical bottoms. A rotating scraper arrangement located within and near the bottom of each silo empties the contents into an enclosed screw conveyor of variable speed. This conveyor may discharge into a mixing box or into a pulp feeder. Through such an arrangement the requisite amount of each furnish for the desired product may be supplied from each respective silo. The necessary percentage of each stock is controlled by regulating the speed of the screw conveyor from its corresponding silo and then blowing each grade of pulp direct to the beaters or other mixing devices.

The value of the screw press for the several applications has been proven in hundreds of European installations. A broader use for the machine, therefore, should be anticipated in this country.

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Tests of Rag-Fiber Paper and Other Studies

A GROUP of commercial permanent record papers tested by the Bureau of Standards gave evidence that paper manufacturers are applying the results of research on permanence qualities. The nine papers tested were of bond type and were made from rag fibers by five different manufacturers. The papers far exceeded the average quality previously found in such papers by the Bureau.

The papers were exceedingly strong, the folding endurance ranging from 2,300 to 11,000, and the strength was stable, the retention of folding endurance under the heat test (exposure for seventy-two hours to 100 deg. cent.) ranging from 75 to 100 per cent. This excellent stability is attributed to the high cellulosic purity and the low contents of rosin and acid found in the papers, all of which are evidence of careful control of the papermaking operations.

The purity of the cellulose is shown by the high content of alpha cellulose, 93 to 98 per cent, and the low copper number, 0.33 to 0.83. When subjected to the heat test, the alpha cellulose did not decrease at all in four of the papers; the same papers did not gain in copper number, while for all the papers the maximum loss in alpha cellulose was 1.7, and the maximum increase in copper number was 0.45. The rosin content was not more than 0.2 per cent in four of the papers, and the most found was 1.8 per cent. Two of the papers contained no acid and the maximum acidity was 0.05 per cent. The average weight of the paper was 68 pounds (per 500 sheets, 25x40 inches), and they were all surface sized with animal glue.

Papers such as these, if stored under favorable conditions, should endure indefinitely.

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◆ OUR MAJOR BUSINESS problem these days is not what can be made, but what can be sold. The stimulus, not of blatant ballyhoo, but of well-founded publicity, was never more necessary than now.—*Dr. Julius Klein.*

Recent Equipment Developments

A partial review of progress by machinery manufacturers in perfecting equipment for process and auxiliary purposes in pulp and paper mills

THERE is an old saying to the effect that in time of plenty prepare for famine. It seems that this thought might be reversed in so far as the attitude and activities of a number of equipment manufacturers supplying the pulp and paper industry are concerned. During the past few years, when business as a whole has not been as brisk as it might have been, these firms have not been content to sit idly by waiting for the return of normal buying. Instead, they have continued their research and development program at a pace, perhaps in some instances even greater than that set by them during the busy days of 1929. This work has resulted in the creation of a number of new items of equipment and worth while improvements in older designs.

Research and development activities of this kind indicate progress not only for the participating equipment manufacturers, but also for the pulp and paper industry. These developments have been quite broad in scope. They not only include developments in process and converting equipment, but also in control instruments, power transmission, and materials handling.

Process and Converting Equipment

Sulphite Cooking Process

A patented process, developed by the Kimberly-Clark Corporation for sulphite cooking and being introduced to the trade in the United States and Canada by the Babcock & Wilcox Company, New York, N. Y., consists essentially of a method of indirect heating of the liquor, positive circulation of the liquor through the chips by means of a pump, and a reliable method of close temperature and pressure control.

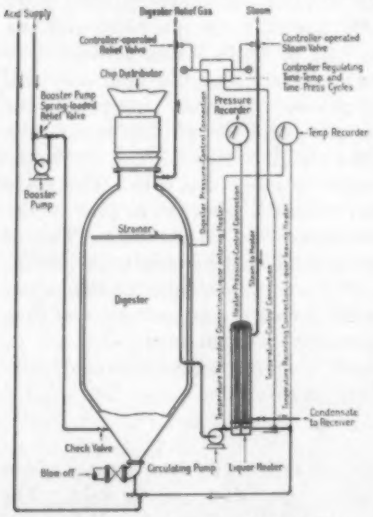


Diagram showing layout of system for indirect heating of sulphite digesters

The liquor for cooking is heated by steam in a heater outside the digester. A two-pass heater is used for this purpose, the steam surrounding the tube bundle through which the liquor flows. Chips are introduced and evenly distributed in the digester by means of a mechanical chip distributor. Liquor is drawn off through a perforated strainer ring at the top of the digester.

A pressure-controlled booster pump supplies acid to the digester when starting up and adds acid to compensate for absorption by the wood. When the desired pressure is reached the pump is shut off. The pump also enables the presure to be brought up as rapidly as is desirable and not by temperature increase only, as would be the case without it, and maintains a high acid level at all times preventing charring and discoloring of the chips at the top of the digester. A method of condensate recovery by the use of air-operated, liquid-level controllers permits continuous drainage of the condensate from the heaters. Complete, automatic control is provided by cam-operated, time-cycle controllers for pressure and temperature, and a cam-operated alarm system for critical points in the operating cycle.

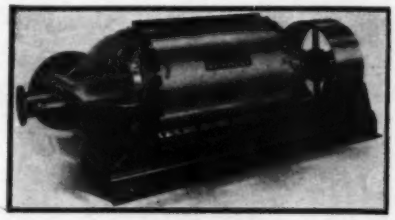
Among the advantages claimed for this system are: maintenance of uniform quality of pulp, physical properties of pulp improved, increase in yield of pulp per unit of wood, increase in digester yield, decrease in sulphur and lime consumption, decrease in steam consumption, and boiler-house operation improved through reduction in make-up water.

Pulp Screening and Thickening

A new design of knot and sliver washer has been developed by the Trimbey Machine Works, Glens Falls, N. Y. This machine has been designed for use in freeing good fibers from centrifugal screen rejections without passing the rejects over a flat screen. It is said to be particularly applicable to soda and kraft installations, but is also suitable for some sulphite jobs. A fractional horsepower motor is sufficient to drive the machine.

Only recently, the Bird Machine Co., South Walpole, Mass., has announced a new slotted-plate pulp screen. In the opinion of the manufacturer, the new screen combines the best principles of centrifugal and other screens in one machine. Only a few minutes are said to be required to clean the screen. This operation is accomplished by a simple flushing.

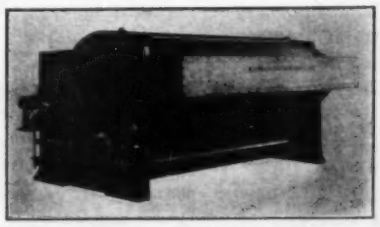
A number of improvements have been made on the old design of pneumatic



The new Bird pulp screen

machine manufactured by the Improved Paper Machinery Corporation, Nashua, N. H., for pulp thickening and save-all purposes. This machine, equipped with a 30-inchx74-inch cylinder mold, can now be furnished with a curved vat, automatic start and stop device, variable speed drive on mold, and with a worm or spur gear reduction unit. The cylinder heads in the improved design have been strengthened; the mold made heavier throughout and carried in anti-fraction bearings; the deckle flanges widened and grooved and easily adjustable deckle straps provided.

A large-size pneumatic with a cylinder mold 48 inches in diameter with 100-inch face has been created by the same company for adaption to washing, thickening, and white water recovery. Standard construction of the mold in this



Shop view of Improved Paper Machinery vacuum filter

machine is brass and bronze, but stainless steel may be used throughout if it is advisable. The mold is composed of a series of air-tight compartments inclined toward the points of discharge. This feature of the design accelerates the discharge from each end of the vat. A vacuum of about two inches is recommended for the vacuum area. It is ob-

tained wherever possible through the use of a barometric leg.

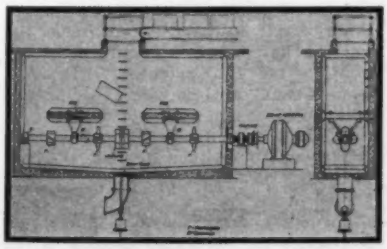
A third item of interest in the development of products by this company is the manufacture of vacuum filters with cylinder molds 60 inches in diameter and up to 144 inches long. These filters, according to statements of the manufacturer, show from actual tests that on white water recovery the fiber loss has been as low as .11 pound per 1,000 gallons and averages well under .5 pound.

Paper Stock Preparation

Several manufacturers of equipment for paper stock preparation have also been active in improving their old line of products or in developing new products.

A number of changes have been made in the design of the pulp shredder manufactured by Ryther & Pringle Company, Carthage, N. Y. The new design, designated as the Ryther 700 shredder, has been developed to provide a machine that is flexible in its application and yet sufficiently sturdy to withstand severe operating conditions. The shredding rotor consists of a forged steel shaft upon which is assembled a series of circular steel blades of different diameters. These blades are alternated between cast iron spacing collars. The collars are machined to a slight angle trom 90 deg. to the axis of the arbor and cause a wabble action to be given the blades. The blades are said to tear all grades of kraft, sulphite, and groundwood pulp, as well as paper stock of every description, to ragged particles of uniform size and susceptible to moisture penetration.

Another new product that is now on the market for reducing sulphite, sulphate, soda or groundwood pulps in baled or lapped form is the Liebeck Fibrator. It is manufactured by E. D. Jones & Sons Co., Pittsfield, Mass., and consists of a concrete chest about 26 feet long by 6 feet wide by 14 feet deep with two horizontal webs about 6 feet above the floor. These webs are of such length as to leave proper sized openings in the center and at the ends. Approx-



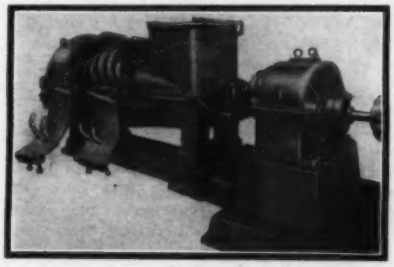
Sketch illustrating construction of Liebeck Fibrator

imately in the center of the space between the underside of the webs and the top side of the chest floor is placed a longitudinal shaft which is joined in the center with a cast steel coupling. This shaft carries two propellers under each web; while heavy, radial and spiral projections are carried by the coupling. The pairs of propellers at opposite ends of the shaft are opposite handed.

In operation, make-up or white water is run into the Fibrator to a depth of about 5½ feet. The proper number of bales of pulp is then fed into the chest through the charging hole in the top. No separation of the bales is said to be required, although wires must be removed as must wrappers if they are too dirty for use in the furnish. The chest, after charging with stock, is filled with water to a predetermined mark to give the desired consistency. The propeller arrangement drives the stock toward the center where, with considerable turbulence, it rises and circulates rapidly toward the ends. Further turbulence is added by means of the coupling projections.

This same company has brought out an improved design of pulper for use in the reclamation and reutilization of machine broke, cutter trimmings, finishing room waste, and old papers.

The disintegrating chamber of the pulper is somewhat conical in shape. In



Jones pulper showing internal construction

the top of the small end and built integral with the upper half of the casing, the casing being split horizontally at the center, is a hopper for the introduction of materials to the pulping mechanism. The design of the upper half also includes two doors which can be swung open on hinges for the purpose of cleaning. At the extreme bottom of the larger end is a clean-out door where water under pressure may be introduced. Slightly above this clean-out opening is the outlet for the treated stock.

Extending horizontally through the center of the chamber is a shaft to which arms or prongs are attached. On the inner walls of the chamber are similar arms or hooks which are attached to come between the revolving arms of the shaft.

The action of the revolving arms, together with the slope of the chamber walls, causes the material being treated to pass naturally through the chamber toward the outlet. Hot water is applied to the material through a shower pipe on the hopper. If it is necessary, steam may be introduced through an opening below the hopper.

It is claimed that this machine treats hard-sized rag, half-rag papers, sulphite, soda, or mechanical pulps with equal facility, and that the capacity runs from 1,000 to 2,000 pounds of stock per hour.

Another development for defibering stock is the continuous breaker beater designed by American Paper Machinery and Engineering Works, Inc., Glens Falls, N. Y. According to the manufacturer, this equipment can be furnished as a complete unit or it may be fitted to a beater tub already installed.

The Apmew hydrator, manufactured by this same firm, has only recently been introduced to the trade. The hydrator, designed to treat stock continuously, consists of a horizontal cylindrical casing with a special inlet opening at one end and three discharge openings along the top side, together with a series of internal raceways which guide six sets of balls, taper rollers, or cylindrical rollers. An impeller, fastened to the shaft supporting the raceways, is located at the inlet end and forces the stock during operation through the various sets of balls or rollers and to discharge.

Stock washing equipment has also received study by at least two manufacturers.

Dilts Machine Works, Inc., Fulton, N. Y., has redesigned its siphon disc-type washer. This washer, furnished in single, double and triple disc construction for installation in beater tubs, formerly used discs of wood construction. The discs are now made of two cast iron sections which are bolted together with bronze bolts. The arms of the sections are recessed to allow wood strip inserts for tacking the wire mesh. A heavy roller chain encased in a copper guard is used for the drive, while the bearings are of a graphite inserted type requiring no lubrication.

The dirty water passing through the wire cloth face is removed by a natural siphon action. This action is maintained by a water-operated air exhauster which immediately reprimes the siphon in case the water is sucked out of the interior of the washer faster than it goes through the wire covering. The pipe through which the water is removed acts as a support for the rotating discs.

The latest development of the Improved Paper Machinery Corporation is a multiple stage, cylinder mold type, pneumatic washer. Two molds, 48 inches by 100 inches, are usually required for satisfactory washing, although the machine can also be furnished with three or four molds if conditions seem to warrant. In this machine, a large part of the mold area is subjected to a low vacuum, while the sheet that is formed on the mold face is removed by a blast of air from inside the mold.

In operation, the stock is admitted to the first vat at from .5 to 1.5 per cent density where it is thickened to 8 or 10 per cent, removed by air, and dropped into an agitator section. At this point, the stock is opened up and the fibers separated so that water has access to them individually. The stock then flows from the agitator chamber over a dam into the succeeding vat, where the water containing undesirable residues passes through the wire; the stock is again removed by air, and dropped into the succeeding chamber. This process is

continued until the washing is complete.

The filtrate from the first mold contains the bulk of the undesirable residues and is sent direct to the sewer. Water from each succeeding mold is used in the preceding vat for dilution as showers. Fresh water is used for the last cylinder.

A machine with a wood vat and stainless steel for the metal parts coming in contact with the stock is recommended by the manufacturer for the washing of sulphite pulp from the pits.

An improvement in jordan design has been announced by E. D. Jones & Sons Co., Pittsfield, Mass. The new design not only includes a horizontally split shell, but also a non-adjustable plug. Adjustment is obtained through the shell rather than through the plug as formerly. It is claimed that a more accurate adjustment can be obtained by this method.

Within the past few years, several types of centrifugal machines have been introduced to the paper industry for the purpose of removing undesirable dirt from the paper stock previous to fabrication. The most recent machine of this class that has been brought to the attention of the papermaking industry is the so-called Miami Centrap, manufactured by Shartle Brothers Machine Co., Middletown, Ohio.

The Miami Centrap employs three non-floating-type baskets which are nested together. The stock, fed proportionately and separately to each basket at a velocity of approximately the rim

The Shartle Miami Centrap

speed of the basket, is distributed to all points on the circumference of the basket bottoms. Each basket discharges separately into a common gutter where the clarified stock flows by gravity to the paper machine screen or to the machine headbox.

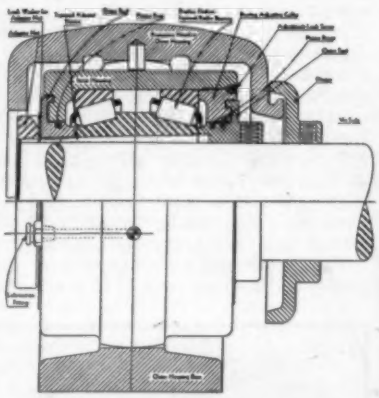
It is claimed that volumes of from 500 to 1,600 air-dry pounds of stock per hour, or even more on cheaper grades of furnish, can be handled at maximum efficiency by the Centrap.

At least one paper machine screen has been redesigned. It is the Leith Walk screen of E. D. Jones & Sons Co., Pittsfield, Mass. The new design, designated as the Jones rotary inflow screen, operates on the same general principles of the older design but, it is said, with increased capacity and greater efficiency. The new screen cylinder with single end discharge has been increased in diameter, the vat has been enlarged, and the vibrating diaphragm has been increased to act over 55 per cent of the surface of the new cylinder.

Paper Machine Developments

This progressive movement on the part of equipment manufacturers has not failed to include improvements for the paper machine.

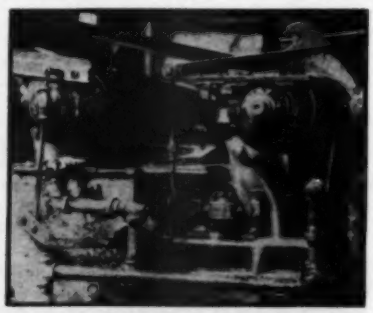
A cylinder mold bearing has been developed by Dodge Manufacturing Corporation, Mishawaka, Ind. This



Sketch of Dodge-Timken cylinder mold bearing

bearing, known as the Dodge-Timken cylinder mold bearing, has been designed to give complete protection against the severe operating conditions incident to such service. The bearing construction is of the adapter type which provides for secure fastening to the shaft. Seals of both the flinger and piston-ring type have been provided to exclude water and to protect the bearing. There is also a protective hood and a flinger on the shaft.

An extractor roll for use in removing large quantities of water from a sheet of board as it comes off the last mold of a cylinder machine has been placed on the market by Downingtown Manufacturing Co., Downingtown, Pa. It is claimed that by test from 2 to 3½ pounds of water per pound of dry finished board is removed by such a roll. At the same time, it has been suggested that the use of an extractor eliminates picking by the pickup felt, increases the life of a pickup felt on an average of 25 per cent and gives the sheet a better



Installation view of Downingtown extractor roll

finish with a possible increase in bulk. The benefits of a single unit installation, according to the manufacturer, have been so pronounced that multiple units of two or three extractors are now being recommended on single board machines. The installation of a multiple unit in one case involved the shortening of the top felt from 161 feet to 80 feet.

Another development of the Downingtown Manufacturing Co. is a suction felt roll for conditioning felts of both fourdrinier and cylinder machines. This roll has a centrifugally cast bronze shell with the same drilling as the shell of a Downingtown suction couch roll.

A Downingtown suction felt roll installation

The suction box is equipped with packing strips that are mounted to produce uniform pressure along the entire shell. It may also be adjusted to obtain proper packing strip pressure and to take care of wear. Furthermore, it can be changed to any angle so that the position of the roll can be changed to conform to any location on the machine. The roll, mounted in anti-friction bearings is built 10 inches in diameter for rolls up to 120-inch drilled face, 12 inches in diameter up to 160-inch drilled face, and 14 inches in diameter up to 200-inch drilled face.

A suction box cover that is said not to require the continual planing of the ordinary maple cover, with the added advantage of a very long life, has been introduced by Rice, Barton & Fales, Inc., Worcester, Mass. This cover is made of wood that has been treated with a patented process.

Another comparatively recent development, although the idea is not new,[1] is the use of rubber-covered suction

[1] Rubber Covered Suction Rolls, P. M. Foster, THE PAPER INDUSTRY (Feb., 1932).

press rolls. It is believed that much of the pioneer work in this development was sponsored by the Beloit Iron Works, Beloit, Wis., in collaboration with the Cincinnati Rubber Manufacturing Co., Cincinnati, Ohio. Downingtown Manufacturing Co. has also done some work on rubber-covered suction press rolls, as have other rubber-covered roll manufacturers.

A partial list of the advantages claimed for this kind of roll would include: increase in felt life, increase in production, prevention of sheet marking, tendency to eliminate breaks, and a greater water removal at the press.

An interesting fact, although it relates to an item concerning an allied industry, is the recent installation of a 540-inch loom in the plant of the Waterbury Felt Co., Skaneateles Falls, N. Y. This loom is said to be the widest loom ever manufactured in the United States and also the widest loom in use by a felt manufacturer in this country. Finished felts up to 320 inches in width can be woven on this loom, as can endless felts a little over 100 feet in length.

Attention has been given by Rice, Barton & Fales, Inc., Worcester, Mass., to improvement in the design of its paper machine doctor for use on dryers, calenders, or any other place where a doctor may be used.

A new line of self-supporting, oilless, balanced carbon, steam fittings has been brought out by Beloit Iron Works, Beloit, Wis. These fittings are made in several styles and in the usual sizes. They are also made in an offset type which is being used, it is said, to replace the old style ball joint fitting without requiring any changes to the piping.

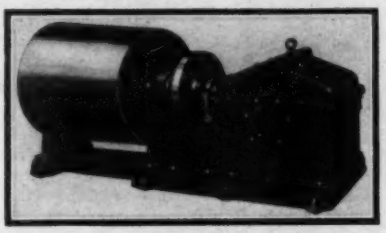
In many cases, power savings for these new types of fittings over the old unbalanced type are said to exceed 1 hp. per dryer. A saving in oil, as no lubricant other than that contained in the graphite impregnated carbon disc is used, and a saving in maintenance and repairs are also claimed for these balanced types of steam fittings.

Spur gears have been commonly used for years to drive the dryers, although within very recent years several other methods have been tried. The latest development along this line is thought to be that of the Black-Clawson Co., Hamilton, Ohio. It consists of an arrangement through which each dryer is driven by a pair of hpoid gears similar to the gears that are used on a drive stand except smaller in size. The pinion gear, being off-center of the large gear, permits the use of a shaft along the machine to connect an individual row of dryers, thus allowing the top and bottom row of dryers to be spaced farther apart. The dryer journals on such a drive are equipped with Timken bearings as are those of the pinion shafts which connect the top row of dryers and the row of bottom dryers respectively. The housings supporting the dryer journal bearings are integral with the gear casings which enclose the gears in oil-tight chambers. A silent chain is arranged to drive both the top and bottom shafts with the power received from a separate floor stand driven from a line shaft.

This drive, which permits easier access to the drive side of a machine, eliminates much of the personal hazard to operators and is said to operate silently and without vibration.

Interesting developments of Stickle Steam Specialties Co., Indianapolis, Ind., include a means of overcoming a moisture problem more or less common to papers produced on machines equipped with smoothing presses, and a method for handling condensate from paper machine dryers without the use of cooling water on vacuum pumps. It has been possible, according to statements of the manufacturer, to hold the moisture content of finished paper produced on two paper machines using smoothing rolls within one-half of 1 per cent change in contrast to paper coming to smoothing rolls with the right moisture content to obtain best results from the press and then leaving the dryers either too wet or too dry. The handling of hot condensate from paper machine dryers without the use of cooling water on vacuum pumps is accomplished in either of two ways. One method utilizes a specially designed piece of radiation equipment which transfers the excess heat in the condensate to the air used around the paper machine for improving drying conditions. The second method, primarily for paper machines using the higher drying pressure, consists of a means of pumping the hot condensate, from which the air has been eliminated, back into the boilers.

Consideration of a drive for paper machines by Dodge Manufacturing Corporation, Mishawaka, Ind., resulted in the development of the so-called Dodge hypoid drive. This drive, as the name implies, is designed around the use of hypoid gears in the gear unit together with a suitable clutch and cone pulley arrangement. The great reduction unit is equipped with Dodge-Timken bearings. Dodge-Timken unit mounts are



Dodge hypoid paper machine driving unit

used in the pedestals. The clutch, Diamond "D," is shifted electrically by remote control. The cone pulley is designed with a slight taper and a generous face. This design permits close adjustment of the draw. It is simply necessary to shift the driving belt across its face until the desired draw is obtained. The belt is held in the desired position by a shifter which may be manually or electrically controlled.

A new magnetic clutch has been brought out by Beloit Iron Works, Beloit, Wis. It is made in single and multiple disc types. Torque is transmitted by the disc to two clutch halves through spur gear teeth. When the clutch is de-energized, the driving discs are thrust away from the lining by a series of coil springs. A fan, built into the clutch as part of the main housing, draws air to the springs and across the discs. It is claimed that this clutch is particularly suited for hard and frequent starting or for service where a clutch must be slipped for unusual periods of time.

Some interesting work on the development of a highly specialized machine

Shop view of Black-Clawson hypoid gear dryer arrangement

for the manufacture of facial tissue has been done by The Bagley and Sewall Company, Watertown, N. Y. Several machines of this type have been built, and it has been suggested that through their use it has been possible to attain both an ease of operation and a uniformly high grade product.

Paper Converting Machinery

New developments have also been made in the field of paper converting equipment. One manufacturer in this field, Paper Converting Machine Company, Green Bay, Wis., has brought out an embossing toilet winder, a high-speed rotary tissue folder, a special three-color automatic press, a special fold towel machine, an all ball bearing napkin folder, a four-wide napkin folder capable of producing 1,000 napkins per minute, a special box machine, a special bundling press, and several different types of embossing units.

The Hudson-Sharp Machine Company, Green Bay, Wis., another paper converting equipment manufacturer, has also developed a number of new machines. A list of these developments includes a butter dish machine, rotary type towel inter-folding machine, spiral core cutter, tablecloth machine, wax winder, dampening machine, facial tissue machine, paper seat cover machine, automatic feeder for discs and blanks, automatic wrapping machine, and a bag folder. The purpose of most of the machines is indicated by the names, but a brief resumé of the functions and capacities of a few of them may be of interest.

The butter dish machine was designed for forming and shaping paper butter dishes, lard dishes, etc., at the rate of 9,000 to 10,000 per hour. It is equipped with an automatic counter for registering production. The rotary-type towel interfolding machine was designed particularly for the production of interfolder towels of different types, and permits the production of towels of any width from 9 inches to 13¼ inches without any changes with the exception of moving slitters. The tablecloth machine has a high production of 5,000 to 6,000 forty-inch tablecloths per hour; the machine embosses, colors and folds the cloths in one continuous operation. The dampening machine was designed for uniformly dampening or moistening paper plate blanks at a speed of 50,000 per hour. The facial tissue machine, the company's most recent development, is built to receive paper of almost any width, the usual widths being 36 inches and 63 inches. The 36-inch machine has a guaranteed production of 150,000 folds per hour of sheets in one thickness, or 300,000 folds per hour of three thicknesses.

Stock Regulation

The automatic consistency regulator manufactured by Trimbey Machine Works, Glens Falls, N. Y., has been improved and now has no moving parts in the stock other than a hard rubber float which rides on the stock in the variable stock level chamber. As the stock consistency changes, the float rises or falls and through this movement directly controls the operation of the motor-driven water valve. The use of a distant control water valve in connection with a regulator installation permits the regulator proper to be located on a convenient operating floor. The water valve is placed on a floor or two below and obtains its water supply by gravity from a screened stock line, from the white water from a thickener, or from some similar source.

Shartle Brothers Machine Co., Middletown, Ohio, now manufactures the Thyle consistency regulator. This regulator is composed principally of four different pieces of equipment, namely: a control

Thyle consistency regulator showing major parts

or density detector, an electrically driven dilution valve, an automatic reversing switch and a signal light arrangement.

The control unit is generally installed in a headbox with its plug or rotor exposed to the flow of stock. The rotor, rotating at a constant speed and driven through a small motor mounted to swing through a given arc, is affected by changes in the consistency of the stock to which it is exposed. This frictional resistance of the stock to the rotating rotor causes the rotor motor to tilt. As the motor tilts, it throws into action a mercury switch, which in turn operates the motor driven dilution valve that admits or shuts off water to the stock. When the desired consistency is obtained, the rotor motor swings back to its original position, thus breaking the contact of the mercury switch and shutting off the dilution valve. The signal light arrangement warns the operator when the stock is too heavy or too light.

Another firm that has been active in the development of consistency regulator equipment is the Merritt Engineering & Sales Co., Inc., Lockport, N. Y. Among the items developed by this company that might be mentioned are: an automatic water feeder for the admission of water to the tub of a continuous or batch beater, and an automatic consistency regulator.

It is claimed that this automatic water feeder by the addition of water to slush stock will convert this stock to uniform consistency, and that it will also control the defibering of dry stock to any final density for which the instrument is set. The automatic consistency regulator, which has been on the market for several years, has been simplified and improved in design. In brief, the unit consists of a chain driven paddle, or agitator, that is immersed in the body of stock being regulated. The varying resistance of the stock to the rotation of the agitator is reflected in the tension of the chain drive and through it is transmitted to a water feed valve which admits more or less water as required. Should the stock become too light to permit regulation or cease to flow, or the machine itself for any reason stop working, it is immediately indicated by a red signal light.

Control Instruments

A general purpose photoelectric relay with several new and important features has been developed by the General Electric Company, Schenectady, N. Y. This relay provides more sensitive control than the models which it supercedes, and at the same time will permit operation at a minimum light intensity of three foot candles. Because of its improvements and refinements the relay affords a wider range of industrial applications than its predecessors. It may be used to stop a paper machine when a break in the sheet occurs; for aligning paper on rolls, deflecting packages on conveyors, counting such items as bags and boxes of material, or for starting and stopping machinery where limit switches are not practical or where articles are too small and light to operate a mechanical switch.

One of the latest developments of the Bailey Meter Company, Cleveland, Ohio, is a relay pressure valve known as Style G. It is designed to give extremely accurate pressure control of steam, water, or gas lines. Briefly, the relay valve controls the pressure within close limits by regulating the movement of a syphon-operated or piston-operated throttle valve installed in the line, in which the pressure is to be controlled. A minute change in the controlled pressure will result in a relatively large change in the motive pressure to operate the regulating valve.

Another product that has been designed by this company is known as the Bailey adjustable orifice. It has been designed for use with meters measuring gas or low pressure heating steam. The adjustable orifice consists of a flanged body with integral meter connections. It can be installed in a steam, water, or gas line and connected to any differential head type of fluid meter. A micrometer adjusting screw permits setting the height of the gate segment within .001 of an inch. When it is advisable to change the capacity of the meter, it is simply necessary to set the micrometer screw at the reading corresponding to the desired maximum capacity as obtained from curve sheets furnished with the orifice.

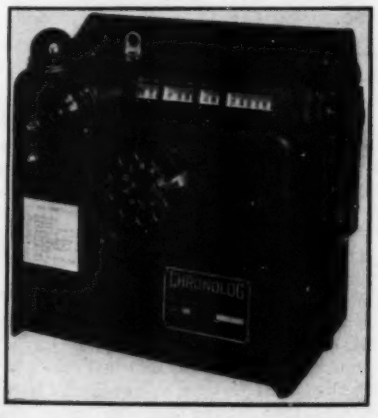
A new, electrically operated control instrument has been developed by The Foxboro Company, Foxboro, Mass. It is known as the Rotax electric controller, and may be used to control temperature, pressure, humidity, flow, and liquid level, and to give audible or visible signals. The outstanding feature of the instrument is the use of rotating or commutator type contacts. It is claimed that this type of contact gives more accurate control; that it allows uninterrupted pen travel; that it gives positive

contact at all times with a minimum of arcing, and that it can be set from outside the case.

The Brown Instrument Company, Philadelphia, Pa., has rounded out its line of fluid measuring instruments by the addition of a new mechanical flow meter. It has been developed in a number of combinations, including square root and evenly divided charts; automatic planimeter; multipen-flow, pressure, temperature; compensation for pressure and temperature; and automatic control and recording. This line of flow meters is featured by a direct, lever-actuating mechanism, by a float, by a pressure tight bearing with grease reservoir, by a series of range tubes that permit changing the range of the meter without disturbing the orifice, and by a type of construction and assembly whereby the manometer may be taken apart and cleaned in the field without altering the calibration.

New developments of The Bristol Company, Waterbury, Conn., include a line of direct reading absolute pressure recorders, automatic process cycle controllers, and free-vane, air-operated recorder controllers. The direct reading, absolute pressure recorders are designed for service where the control and operation of the apparatus relies on the maintenance of a high and constant vacuum. The actuating mechanism consists of two, extremely sensitive diaphragm elements—one connected to the vacuum line and the other directly affected by barometric pressure variations. The resulting movements of these elements are transmitted by a special form of differential transmitting linkage to a single pen arm which permanently records on a suitable chart. The process cycle controllers are used in association with Bristol's automatic temperature and pressure controllers to intensify precise control of uniformity of product, while the free-vane, air-operated recorder controllers are designed to operate with all standard types of diaphragm motor valves for use in temperature or pressure control.

An instrument to control idle time, termed the Chronolog, has been developed and is being built by The National Acme Company, Cleveland, Ohio; it is being marketed by the Graybar Electric Company. This is a device that is said to give the operator a visible record of idle and productive time and a count of the units produced, such as feet of paper. Further, it is said to present to the foreman or superintendent a detailed printed record revealing conditions of operation, and in addition, produces any desired number of so-called Chronocards on which are summarized total idle time, total productive time and units produced for routing to timekeeper, or to the time study and production departments. The device is energized by an ordinary lighting circuit. Whenever the machine or equipment to which the Chronolog is applied is shut down for any cause, the operator registers the shutdown by dialing a symbol letter corresponding with the reason for the shutdown. At the same time, a red signal light goes on to let the foreman or other supervisor know that the machine or equipment is not producing. The instrument records the accumulating toll of idle time until normal production is resumed, when it automatically stops counting idle time and resumes the count of productive minutes and units produced.



New instrument to record idle time

A new, portable tachometer for testing r.p.m. machine speeds has just been put out by the Amthor Testing Instrument Co., Inc., Brooklyn, N. Y. The most important feature of the device is the automatic fixed reading whereby speed readings are automatically fixed on the dial after each time the instrument is used. When applied to a revolving shaft, the pointer instantly points to the speed, but when taken away, it does not return to zero. The dial reads directly in r.p.m., but accessories are provided so that speeds in feet per minute can be taken.

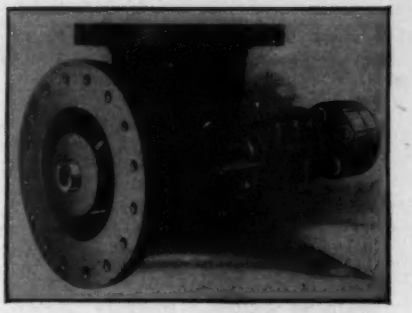
Materials Handling

Equipment developments in the field of materials handling may be broadly classified into equipment for the transportation of liquid or materials in liquid suspension, of gases, and equipment for the transportation of solids.

Several pump manufacturers seem to have been particularly active in bringing out new designs of pumping units.

Buffalo Pumps, Inc., Buffalo, N. Y., have brought out a new pumping device known as the Buffalo Rotajector for the handling of pulp and paper stock. The unit, which is provided for any position of suction or discharge, and for vertical or horizontal drive, consists of a heavy elbow in which is placed a rotor of special design. It is claimed that the Rotajector will handle stock of any consistency that will flow and reach the impeller; that air binding is impossible if the unit is properly installed; that priming is unnecessary as it can operate dry and does not require venting, and that stock carrying in suspension gas, foam, air, size, alum or coloring ingredients can be handled successfully with the suction pipe only half full.

Another recent development of Buffalo Pumps, Inc., is a stock pump with heavy-duty ball bearings. In this design, the bearing is mounted on the base independent of the pump housing, so that any slight distortion of the casing caused by piping bolted to it, is said not to produce the usual difficulties caused by such misalignment. The design also includes an oil reservoir which extends the full length of the bearing, and a one-piece bearing housing.



Rotajector showing impeller

Lawrence Pump and Engine Co., Lawrence, Mass., has recently added a new design of centrifugal pump to its Lawrence Vortex line. It is known as Type E Electropump and is designed for small and moderate capacities for operation against heads up to 150 feet in a single-stage unit, and twice the head when furnished with two-stage unit in series. It is a general service pump which the manufacturers recommend for circulating hot and cold water or brine, for air conditioning apparatus, and for other similar service.

A new, non-clogging-type, centrifugal pump, for handling pulp of both heavy and light consistencies, has been announced by the Morris Machine Works, Baldwinsville, N. Y. The suction nozzle, impeller and pump passages are designed to secure uniform conversion of the velocity of the material to pressure with minimum friction, slippage, or separation of water from pulp. A special impeller, which is furnished for exceptionally heavy stock, is said to act as a screw conveyor with highly effective results in handling the thickest stocks encountered in pulp mill service.

For acid tower work and for circulating digester liquors, The Duriron Company, Inc., Dayton, Ohio, has developed a number of nickel-chromium alloy steel pumps. The pumps are produced in both the standard centrifugal types and as self-priming pumps, and for either belt or direct-connected motor drive. The largest of the standard pumps has a 3-inch suction and a 2-inch discharge; both inlet and outlet are equipped with split flanges.

Activities of the Baldwin-Southwark Corporation, Philadelphia, Pa., have included the development of a hydro-gas accumulator power system which is suggested for installation where a large rate of liquid supply is needed for a short period, with intervening longer periods of low rate of supply, and where space requirements must also be considered. The system consists of a motor-driven, triplex pump, pressure bottles and control devices, and is automa-

tic in operation. The bottles replace the conventional weighted accumulator and the shock valves. They are partially filled with an inert gas, or with compressed air, depending upon design and service considerations. Pressure range is controlled by means of pressure gauges with electrical contacts which control a solenoid operated by-pass valve in the line from the pump to the hydro-gas accumulator. In addition, there is another electrical contact which serves to interrupt the current to the motor in case of failure of the normal maximum control. Ordinary spring-loaded safety valves are provided as an additional protection.

An improved line of horizontal duplex steam pumps, especially designed and fitted for handling either water or chemical solutions, has been announced recently by the Worthington Pump and Machinery Corporation, Harrison, N. J. These pumps are built in valve plate, turret, and pot valve types. The valve plate pumps have the discharge valves screwed into a common, removable deck. These units are of the submerged piston-type with all suction and discharge valves above the cylinders. Valve service is of the disc type, and all pumps have the standard duplex steam end. The turret type pumps have the suction and discharge valve decks cast integral with the cylinders, are of the submerged piston design, and have disc-type valve service. Suction valves are accessible through handhole plates and discharge valves through the top cover. Stuffing boxes are of the bolted type with bolted glands. Pumps of the pot-valve pattern, all with submerged pistons, come in three types, namely: for pressures up to 500 lb. per sq. in. with a capacity of 40 to 96 gals. per min., for boiler feed service with capacities of 15 to 760 gals. per min. and discharge pressures to 300 lb. per sq. in., and for pressures up to 500 lb. per sq. in. and capacities of 140 to 1,800 gals. per min.

Worthington has also comparatively recently entered into an agreement with the Nash Engineering Co., South Norwalk, Conn., and has obtained a license to use the Nash Hytor vacuum pump in conjunction with Worthington designed centrifugal pumps for automatic priming purposes.

Valves manufactured by The William Powell Company, Cincinnati, Ohio, from Hastelloy C, a product of the Haynes Stellite Company, Kokomo, Ind., have been found well suited, according to statements of the manufacturer, for service on calcium hypochlorite. Pure nickel valves are recommended by them for the handling of hot caustic solutions; all-iron valves for cold caustic solutions, if slight discolorations are not objectionable; and all iron valves with pure nickel seats, disc faces, and stems for longer service on lines handling cold caustic soda.

A new design of mechanical lift plug valve which the Powell Company has developed has been suggested for use in the pulp and paper industry. A full-way area of approximately 100 per cent is afforded through the valve. The valve is sealed at the top and also at the gland packed yoke at top of valve body. The plug may be lifted vertically a few thousandths of an inch so that the collar on plug stem tightly engages with machined seating collar in yoke and valve can be repacked under pressure when fully open or closed.

In operation, a positive lifting screw collar, the lower of two collars, is rotated counter-clockwise to raise the plug from the valve body sufficiently to eliminate contact. Then the upper collar, which is rigid to the plug stem is rotated to open or close position. After the plug is positioned, the lifting collar is rotated clockwise to seat the plug tight in the body. A stop collar, rigid to the plug stem, limits the movement of the plug through 90 deg. on straightward pattern.

The Davis Regulator Company, Chicago, Ill., has changed its designs of non-return valves for turbine bleeder lines. A globe body and disc-type valve with an oil operating mechanism, either above or below the center line of the valve, is used in these designs. This oil cylinder addition to the valve is an additional safety feature for the closing of the valve, and is operated entirely from the oil system of the turbine through a governor trip mechanism.

The Reed stock valve, another new product of E. D. Jones & Sons Company, is of the single action, lever-operated, hollow plunger type. The valve lever can be locked in any position for control of flow, while the valve can be cleaned and washed out with pressure on the line by closing the valve and removing a drain plug in the bottom of the valve body.

Several equipment developments for the transportation of solids might be mentioned.

The Philadelphia Gear Works, Philadelphia, Pa., has added a new, electric hoist to its line. The hoist is available in sizes from ¼ ton to 3 tons inclusive. It is push-button controlled and uses standard electric motors and Timken roller bearings with ball bearings for the hook swivels. The cable drums are of large diameter with accurately machined grooves. In the design are also included the nickeled bronze worm gears, hardened steel trolley wheels with ball bearings, nickel-steel, heat-treated, helical gears, and hardened and ground thread worms, automatic upper limit hook stop, forged steel hooks, and positive oil-bath circulation. The following operating features are emphasized by the manufacturers: high lift with low headroom; noiseless operation; no load brake necessary, balanced so that load is always under exact center of rail; hoist swivel trolleys turn on 4-foot radius; fine control of load; operating mechanism sealed against dust, dirt, and oil-leakage; and interchangeability of parts.

A convertible crane, shovel, and dragline, known as K-48, has been put on the market by the Link-Belt Company, Chicago, Ill. This machine, when serving as a crane, has a rated capacity of 32 tons at 12 ft. 0 in. radius and 10,400 lb. at 45 ft. 0 in. radius on a 45-ft. 0-in. boom, and corresponding capacities at other radii and for other boom lengths. It will handle, as a dragline, 1¾ cu. yd. heavy, or 2 cu. yd. light-medium bucket on a 45-ft. boom and 1½ cu. yd. heavy, or 1¾ cu. yd. light-medium bucket, on a 50-ft. boom with the boom at any angle convenient for dragline work. It is equipped as a shovel with a 25-ft. shovel boom, 17-ft. 6-in. dipper stick, and a 1¾ cu. yd. dipper. The unit is arranged for gasoline engine, Diesel engine, or electric motor drive.

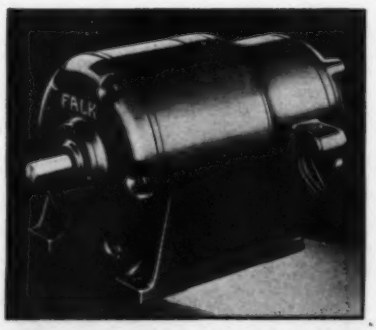
Another comparatively recent development of the Link-Belt Company is a portable flight conveyor. The conveyor is made in lengths of 21 ft., 26 ft., or 31 ft. Steel angles, channels, and heavy plates are used for the frame, and copper bearing steel for the trough. The carrier is made up of two strands of C-188 malleable iron and steel combination Link-Belt to which flights are fastened every 15¾ inches. Two steel roller chain drives connect the head shaft with a motor which operates the conveyor chain at 126 feet per minute. It is claimed that the 21-ft. machine will handle 60 tons of coal per hour with uniform feed, while 90 tons is given for the capacity of the 26-ft. and 31-ft. units.

A third development by this company is a new design of elevator bucket for heavy duty work. It is known as Style "AAP" and is made in such popular sizes as 8x5, 10x6, 12x7, 14x7, 16x8, and 18x8. The bucket is made of Promal, and is designed with a heavy back, reinforced corners, heavy lip and other features to give wear resistance and endurance.

Power Transmission

Among the interesting developments in the field of power transmission are several combined motor and speed reducers.

One of these lines, known as Motoreducers and offered by The Falk Corporation, Milwaukee, Wis., is made in three



Motor and reducer combination unit

styles or types, namely: integral, flexible, and all-motor. In the integral type, the motor end bell is removed and the motor close-coupled through a bayonet type of joint to the gear case. In the flexible type, the round frame type of motor is used and the end bell retained. In the all-motor type, any standard horizontal type motor may be used, the motor being connected through a Falk

flexible coupling to the reducer housing. All three types are supplied in horsepowers from ¾ to 75 with ratios from 4.6 to 288. Non-planetary, helical type gears are used throughout, as are oversize ball bearings except in the larger sizes. A minimum efficiency of 97 per cent is claimed for these units.

The General Electric Company, Schenectady, N. Y., has also announced a line which they have designated as gear-motors. The underlying principle of these units consists of a normal-speed motor in combination with a built-in, internal-helical planetary-gear speed reducer. Such units are also offered with special electrical characteristics such as high starting torque with low starting current, normal starting torque, with low starting current, adjustable, varying speed, multispeed, etc., or with mechanical features such as totally-enclosed, fan-cooled, or of special construction for use in hazardous gas locations. Squirrel-cage, and wound rotor polyphase gear-motors are available in ratings up to 75 hp.; single phase to 5 hp.; and d. c. to 7½ hp.

The Link-Belt Company, Chicago, has likewise added a motorized speed reducer to its line of enclosed speed reducing units. In this design, roller bearings and continuous-tooth herringbone gears are used.

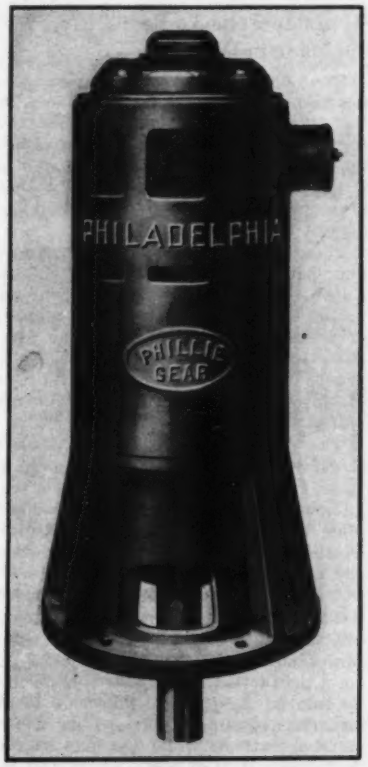
Another firm that has announced a line of horizontal motor and speed reducer combinations is the Philadelphia Gear Works, Philadelphia, Pa. In this line, MotoReduceR, the motor and gear apparatus is self-contained in a single housing with supporting feet at each end of the frame. All gears are made of heat-treated nickel-steel with helical cut teeth. All bearings are of the anti-friction type and the slow speed shaft is mounted on oversize Timken roller bearings spaced to permit overhanging a pinion, sprocket, or pulley without the use of an outboard bearing support. This unit is available in single, double, and triple types with ratios up to 450:1, and with single or polyphase standard open-type or totally-enclosed fan-cooled motors. It is also available with d. c. motors up to 10 hp.

This company has also announced a new motorized vertical speed reducer which is said to be well adapted to agitator service. This unit requires no baseplate, flexible coupling or extra framework for mounting. As in the case of the horizontal type unit, it utilizes gears of hardened nickel steel cut with helical teeth, and anti-friction bearings. The slow speed shaft is mounted to prevent whipping and all moving parts operate in an oil bath. This reducer is available in ratios from 3 to 1 up to 200 to 1, or higher if desired, and for horsepowers from ½ to 75.

A new product of the Graton & Knight Company, Worcester, Mass., is its Research leather belting. This belting is said to have scarcely any stretch in it, and because of its high transmission capacity is recommended for service on beater drives, cone drives, calender drives, jordan drives, and other similar applications.

The Link-Belt Company, Chicago, Ill., has developed a 3/16-in. pitch silent chain that is claimed to be as flexible as a belt and positive as a gear. It is made in three types: middle guide, side flanged, and duplex. The first two types are employed where all shafts are driven in one direction, while the Duplex type is used where reverse direction is desired on some shaft or shafts, or where adjustment features are required.

The Norma-Hoffman Bearings Corporation, Stamford, Conn., has introduced two new additions to its extensive line of bearings and pedestals—its "CD" Duplex double angular contact ball bearing, and LUP series of pedestals. The "CD" Duplex angular contact ball bearing has been designed for the carrying of heavy thrust loads in either direction. The bearing has special raceway curvatures and a special outer ring which permits the use of the maximum number and size of balls, while at the same time the bearing has the same width as standard, single-row, radial ball bearings. This bearing is obtainable in light, medium, and heavy metric series in sizes ranging from 10 mm. to 100 mm. bore.



Vertical motor and reducer combination

The LUP series of pedestals are made up in sizes to fit standard inch, as well as sixteenth-inch, sizes of shafting. The pedestals are equipped with double row, self-aligning ball bearings with adapter sleeves in sizes ranging up to 3½-in. bore. They have a large volume for lubricant and are fitted with protecting felt seals and fittings for the renewal of lubricant as needed. Distance pieces are furnished with the pedestals where the bearings are to be clamped instead of floating.

A new line of Day-Steel, single and multiple, V-groove pulleys, announced by The Dayton Rubber Manufacturing Company, Dayton, Ohio, has been designed for use with Dayton cog-belts for ratings of 7½ hp. and below. The pulleys are accurately formed from heavy gauge pressed steel, strongly welded both at the rim and web, and rigidly assembled with a hub of unique construction.

The newest form of industrial lubrication offered by the Alemite Corporation, Chicago, Ill., is its Metro-Matic system. This system uses a pipe-line arrangement whereby the lubricant is forced under high pressure to each bearing on the machine. A measuring valve, located on the pipe line near the bearing, discharges a predetermined amount of lubricant at each operation of the Metro-Matic pump handle. A short length of copper tubing conducts the lubricant from the measuring valve on the pipe line to the bearing.

What seems to be an important innovation in recent lubrication developments is the guarantee issued by the Standard Oil Company (Indiana), Chicago, Ill., for its Nonpareil Turbine Oil. The guarantee stipulates, quoting directly from it, that "Nonpareil Turbine Oil will not deteriorate; will not form sludge and will not require replacement during the life of the turbine installation. When this oil is in use, your only lubrication expense will be for the replacement of losses due to evaporation and leakage and for straining out water, rust, dust and other contamination from outside sources."

Other Developments

Continued co-operative effort on the part of the Chromium Corporation of America, New York, N. Y., and a number of mills has made it possible for the Chromium Corporation to develop a number of chromium plating applications for various items of pulp and paper mill machinery. Among the applications claimed to have been particularly successful are: evaporator tubes, screen plates, breast rolls, table rolls, couch rolls, wire cloth suction box covers, press rolls, creping rolls, dryers, calender rolls, and embossing rolls.

Several new designs of microscopes have been brought out by the Spencer Lens Company, Buffalo, N. Y. These instruments have been developed to meet the needs of most exacting research work and are mentioned as No. 8, 3, 5, and 30. Each design, of course, has individual features to characterize it.

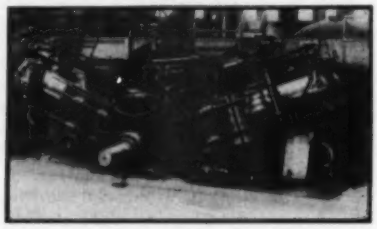
It has only been possible to touch lightly on a few of the highspots. Without doubt, some developments may have been unintentionally overlooked that are of equal or, perhaps, even greater importance than some that have been mentioned. May the items mentioned, however, serve to unfold the panorama of equipment progress in the field of pulp and paper manufacture.

◆ New Grinder Installations

Of outstanding interest in the mechanical pulp field are the Great Northern Paper Company's new grinder installations in its news mills at Millinocket and East Millinocket, Maine.

At East Millinocket, twelve four-foot grinders have replaced 35 of the old two-foot three pocket type, and at Millinocket a program of replacing 70 of the old type two-foot grinders is rapidly being completed, 12 of an ultimate installation of twenty-four four-foot grinders being already in service.

These two grinder rooms are entirely different in appearance and operation from any other groundwood mills in existence. They are the first installations of the new Great Northern Grinder, developed by the Great Northern Paper Company, and built for them by the Montague Machine Company. These grinders are of a hydraulically operated, two pocket type, the pockets utilizing a



maximum of the grinding surface of the stone. Each pocket has above it a small magazine, in which one charge of wood at a time is arranged by the operator. It is claimed that the pre-measured charge, delivered automatically to the pocket, insures freedom from binding, grinding on end, and the other difficulties met with in the usual types of grinder, and allows large productions of highest quality pulp.

All grinders are equipped with Foxboro automatic temperature controls, Ross-Baxter ventilating systems, and those at Millinocket with Messinger roller bearings. The grinder rooms are serviced by twenty-ton electric cranes.

No building alterations were necessary for either of these change-overs, and there has been no interruption of the regular operation of the mills, except for the shut-down of the line under construction. Existing water-wheels have been utilized without changes. There are no overhead charging floors. Wood is delivered to the operators by a water conveyor, and three men tend twelve grinders with apparent ease. At Millinocket, wood from the drive is delivered by water direct to the grinders, without being handled at any point by a mechanical conveyor.

The illustrations show one of the new grinders in operation at Millinocket, and a partial view of the new grinder room at East Millinocket.

◆ Asten Felts To Be Made in U. S.

The Asten-Hill Manufacturing Co., Scotts Lane (East Falls), Philadelphia, Pa., was formed for the purpose of taking over the manufacture, sale and better identification of the Asten Asbestos Dryer Felts which had formerly been developed and sold by the H. N. Hill Co., also of that city.

These felts were originally developed and patented by V. Asten & Co., of Eupen, Belgium, and have been imported by H. N. Hill & Co. for a number of years, during which time the sales have increased and the product was proven and developed to meet the conditions encountered on American machines.

The manufacture of Asten Asbestos Dryer Felts was started in Philadelphia in an experimental manner about a year ago, in order to establish if it was possible to make the Felts in the United States at a reasonable price, in view of the high cost of labor.

These experiments have progressed in a satisfactory manner. It was found that the duty could be saved and economies effected if the felt could be put on a production basis, so it was decided to enlarge the plant to take care of the American business. Based on a production program which the management feels is possible at certain prices, it has been decided to very materially reduce the price of Asten Asbestos Dryer Felts with the idea that this price will develop sufficient business to enable them to maintain that price.

The Asten Asbestos Dryer Felt is a multiple fabric with an upper surface woven of asbestos which protects it from the heat of the dryers, and a backing of tightly woven cotton yarn. They are woven in a very complicated way which prevents any tendency to stretch or lengthen on the machine, and at the same time making a very open fabric with good porosity so the steam vapors readily pass through the felt.

Asten Felts are pre-shrunk and stretched before shipping so that they will not shrink or narrow on the machine. Due to this fact they are often supplied woven in the form of an endless belt, or equipped with the patented clipper seam which is joined by simply inserting a wire through the clipper hooks and makes practically an endless joint on the side that comes next to the paper.

◆ Permanent Exhibit of Roll Paper Products

Visitors to the Cameron Machine Company, 61 Poplar Street, Brooklyn, N. Y., have passed much favorable comment on the extensive exhibit of roll paper products on display there. The exhibit assembled under the direction of H. E. Overacker, advertising manager of the company, comprises a full range of roll sizes from a 60-in. diameter roll of board to rolls of passepartout tape 1½ inches in diameter.

The range of sizes in itself gives an insight into the demand for paper in roll form, but of still greater interest is the various kinds of papers wound into rolls and the uses to which this paper in roll form is afterwards put. Some products appear in this exhibit which have never

gotten beyond the experimental stage. Other products known to the public for years are shown applied in new ways. Truly an excellent place for the alert manufacturer to pick up new ideas.

Not only are roll products on display, but also samples of pasting, combining, strip combining and laminating, as the Cameron Machine Company is now making machines for these purposes.

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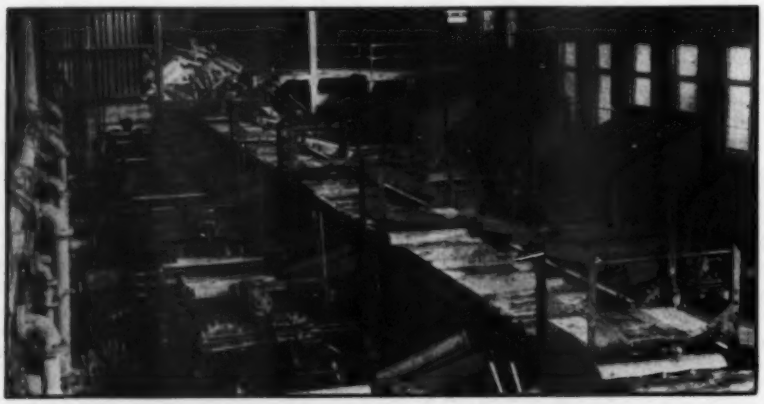
◆ Joe Pirie With Nekoosa-Edwards

The Nekoosa-Edwards Paper Co., Port Edwards, Wis., has announced a new line of fine printing papers and the appointment of Joe Pirie as general sales manager of the Fine Paper Division.

Mr. Pirie has been associated with the Fox River Paper Co., of Appleton, Wis., for the past five years as sales manager. Previous to that, he represented the Neenah Paper Co., Neenah, Wis.



T. A. P. P. I. Fall Meeting Highly Successful

Local committee is praised for planning well blended program of business and recreation. Attendance exceeds expectations

THE fall meeting of the Technical Association of the Pulp and Paper Industry, held in Holyoke, Mass., September 14, 15 and 16, was distinguished by a number of features which made the gathering stand out as one of the best conducted and most successful of any held previously. Under the general direction of Miss Helen U. Kiely, the Committee of Arrangements planned a business program for the forenoons, the afternoons and evenings being given over to entertainment and recreation.

The attendance was unexpectedly large, upwards of 275 persons being registered. The scientific and business sittings were presided over by President Allen Abrams who was praised on all sides for the business-like precision with which the meetings were conducted, these opening punctually on schedule time and closing at the hour for luncheon, which on Wednesday was served on the roof garden of the Hotel Nonotuck; on Thursday at Mt. Tom Golf Club, and on Friday at Couture's Grove, Hampton Ponds, a nearby resort.

Met in Holyoke 15 Years Ago

In opening the first business sitting on Wednesday morning, President Abrams mentioned that the association had met in Holyoke fifteen years ago, in September 1917. It was the first time, however, in the annals of T.A.P.P.I. that a lady had served as chairman of the committee on arrangements and with such evident success. Mentioning Miss Kiely by name he called on her to speak. Just as she rose and had uttered the words "the mayor was supposed to do this," W. O. Johnson, chairman of one of the local committees, said "the Mayor is here," and escorted him to the platform.

Mayor Henry J. Toepfert delivered a pleasing address of welcome and extended the freedom of the city to the visitors who, he said, had come in larger numbers than was expected. Provision had been made for an attendance of 150, and nearly 300 had registered.

The response to the Mayor's welcome was made by President Abrams. He said he had been informed by Miss Kiely that 65 per cent of the men who registered at the fall meeting in Holyoke fifteen years ago had since become vice-presidents or executives of paper mills.

Following announcements of mill trips and other recreational events by Miss Kiely, President Abrams started the technical sesion with the statement that the set-up of T.A.P.P.I. was now as complete as it could be made, the association now covering all aspects of pulp and paper manufacture. He made a plea to members of committees to do their full share of work and said that if unable to serve they should resign.

Symposium on Fiber Properties

A symposium on what was called "Papermaking Variables" opened the proceedings. This was in charge of Fred C. Clark, chairman of the Operating Division, who stated that there were a great many variables in papermaking of which little was definitely known. The program listed the following papers which were to be read and discussed at a sitting lasting only two and a half hours: Relation of Sheet Properties and Fiber Properties in Paper, by R. H. Doughty, Forest Products Laboratory; The Effect of Fiber Length on Pulp and Paper Properties, by Roger B. Brown, Trenton, N. J.; White Water Use in the Fine Paper Mill, by Samuel Hellberg and Andrew Jackson, American Writing Paper Company; Chemical Trim Process, by L. M. Booth, Booth Chemical Company; From Mine to Consumer, moving picture by American Brass Company, Waterbury, Conn.

Pulp Evaluation and Paper Design

The paper by Mr. Doughty gave the results of a series of studies of sheet properties and fiber properties in paper. He is the holder of a joint research fellowship financed by the American Paper and Pulp Association and the Technical Association of the Pulp and Paper Industry for the study of problems of precise and economical paper manufacture.

Miss Helen U. Kiely, who directed the Committee on Arrangements for T. A. P. P. I. meeting

The project was an ambitious one, having to do with selection of suitable raw materials and control of process variables, it being premised that the structure of a sheet of paper depends upon the properties of the material of which it is made, as well as on variables of the manufacturing process. An explanation was given of the engineering concepts of sheet properties and of the means taken to develop methods for the exact numerical evaluation of papers, of pulps and stuffs, and of the effect of process variables. The basic nature of the work in its attack upon the problems of paper manufacture and as a foundation for continued study of these problems was discussed.

The researches reported by Mr. Doughty were preliminary to a further study involving a consideration of such diverse matters as the development of a mathematical theory of the relation of sheet properties through structure to fiber properties, analysis of pressure and shrinkage phenomena, exact measurement of three-dimensional fiber orientation in sheets, analysis of the complex strength properties of sheets in terms of their simple components, and development of precise measures for the fundamental properties of fibrous raw materials.

Effects of Fiber Length Discussed

The paper was discussed by Roger B. Brown who read his own contribution to the symposium dealing with the effect of fiber length on pulp and paper properties. His conclusions were as follows:

1—From a scientific viewpoint, slowness increases as fiber length decreases.

2—From the standpoint of practical papermaking, fiber length has a negligible effect on drainage rate.

3—Fiber length has practically no effect on porosity.

4—Fiber length has practically no effect on the shrinkage of a sheet while drying.

5—Springback and color are unaffected by fiber length.

6—Uniformity of sheet formation is largely dependent on fiber length.

7—Tearing strength is greatly influenced by fiber length.

8—Reducing the fiber length decreases the bursting strength.

9—The short fibrous material originally present in pulp is entirely different in characteristics than equally short fibers made from long fibers from which the original short fibrous material has been removed.

10—From the standpoint of practical papermaking drainage rate, color, porosity, springback and shrinkage are affected to a much greater degree by other factors than fiber length.

W. Boyd Campbell discussed Mr. Doughty's paper. He said he was much interested in Mr. Doughty's work which correlated fairly well with results which Campbell himself had obtained. Fiber length is not of so much importance though it is true to some extent that it has an influence, but it is not the whole truth, much depending on the stiffness of the original fiber. Beating increases the flexibility of fibers.

Mr. Brown discussed the effect of beating on the pulp and said there were not five men in the room, including himself, who knew anything definite about how beating affects fibers.

C. M. Baker, engineer for American Paper and Pulp Association, inquired if a better sheet could not be made from a mixture of short and long fibers instead of using all short fibers, it being understood that the paper referred to was made from unrefined chemical woodpulp.

Mathematics of Air Drying

D. W. McCready, instructor of chemical engineering, University of Michigan, was called upon to present his paper on "Drying of Pulp and Paper," and he gave some highly interesting algebraic formulas on the mechanisms of air drying as postulated by Lewis and Sherwood in papers contributed to *Industrial and Engineering Chemistry*. He said that two mechanisms of drying have been found for the air drying of pulp and paper: (1) evaporation of water at the surface of the solid when the flow of free water is sufficient to maintain the equivalent of a film of water on the surface, and (2) evaporation of water in the interior of the solid as the flow of free water decreases. The rate of drying depends on the condition of the drying air and the permeability of the dried solid to water vapor and is not a direct function of the water content of the solid. He gave drying data on pulp slabs of varying permeability to water vapor as proof of the two mechanisms of drying and illustrating the effect of permeability on the water distribution in the solid. The types of shrinkage and the effects of drying on the physical properties of finished paper were briefly mentioned and explained.

Mr. McCready's paper impressed the majority of those present as a highly academic lecture on the mathematics of paper drying.

Use of White Water and Prevention of Slime

The use of white water in a fine paper mill was discussed in a paper by Andrew Jackson who stated that stock is beaten best in water that has been rendered slightly alkaline. In the control of slime, exceptionally fine results have been obtained with an ammonia-chlorine treatment, much better than those obtained with straight chlorine. He gave an explanation of the installation.

Samuel Heilberg presented a separate paper embodying a description of white water surveys. Two preliminary surveys were made to determine actual losses of fiber on the machine. In the first survey it was found that the main sources of losses were suction boxes, wire pit and press pit. The loss expressed as "total suspended solids" was 46 lbs. per ton machine production, or 2.3 per cent. The loss was remarkably constant from day to day, the variation being less than 10 per cent above or below the average results.

A second survey, taking only the suction box water, showed 31 lb. per ton machine production, or 1.55 per cent. The average variation of this survey was less than 6 per cent above or below the average result. This showed very definitely that nearly 75 per cent of the waste came from the suction boxes.

Hydrogen-ion determinations were made, the pH at various points being given as follows: fresh water, 6.43; machine mixing box, 4.19; machine head box, 4.27; table roll save-all tray, 4.35; suction boxes, 4.29; shower couch roll tray, 5.96.

Being convinced that a large amount of waste could be reclaimed by means of a white water system, a partly closed system that could be eventually closed was made use of. A survey of the actual savings in dollars and cents was made. By reusing suction and shower water for furnishing and dropping beaters and dilution at the machine mixing box, a saving of 15 lb. per ton machine production, or .75 per cent, was effected. In another survey, white water from the suction boxes only was used for furnishing and dropping and dilution at the machine mixing box, with a saving of 19 lb. per ton, representing 66 per cent efficiency.

Difficulties with a Closed System—Difficulties were encountered when the system was closed completely. As described, the plan was made up of two separately operated, completely-closed systems, one of which received white water from the suction boxes and the overflow from the shower couch roll tray and returned this supply to the beaters, machine mixing box, jordan mixing box and auxiliary screen. The return to the beaters was separate and the use of this line was operated by a remote controlled motor switch. The other system received the shower water and returned it to the showers.

The difficulties referred to were slime formation, dirt and ridging of the machine wire. Slime difficulties arose from the use of chlorine alone in the white water supply tanks, but were entirely eliminated when a change was made to the ammonia-chlorine treatment. It was found that a combination of six parts of chlorine and one part of ammonia gave the most satisfactory results with an average residual chlorine of 0.2 parts per million.

Acidity Interfered with Sizing—Sizing difficulties were encountered in the reuse of white water in the beaters, owing to the increased acidity of the white water and its higher temperature. Better results were obtained with the reuse of white water in beaters when the amounts of alum and resin used were decreased. More time is required to beat stock to the desired slowness when white water is used and this was attributed to the high temperature of the water. Work on the problem of temperature in beating was now being undertaken. A comparison will be made of paper when the stock is beaten with water at 50 deg. Fahr. and at 80 deg. Fahr. respectively. It was thought that the high concentration of soluble salts in the reused water might tend to slow up hydration.

Mr. Heilberg said that very satisfactory results had been obtained in reusing white water in all places except in beater furnishing.

The paper was discussed by Mr. Baker who said that white water utilization was an individual problem in every mill, depending on color changes. With white water reused less alum is used by one mill. Slime control was now possible with ammonia-chlorine treatment, and this he regarded as a distinct advance in technic.

The paper by L. M. Booth on "Chemical Trim Process" was next called for.

Chemical Aspects of Sheet Formation

As opposed to pH determinations of the acidity or alkalinity of white water, or water carrying the stock, Mr. Booth favors a total acidity test used by the American Water Works Association, which involves titration to a definite pink color with N/50 sodium hydroxide solution using phenolphthalein as the indicator. When using 100 cc. of water for the test, the number of cubic centimeters of sodium hydroxide used, multiplied by ten, gives the result as total acidity, expressed in parts per million of calcium carbonate. This method, he said, gave the quantity of acids present in the water with which the sheet is formed, whereas a hydrogen-ion determination indicated merely the intensity of acidity. By means of total acidity calculations in addition to pH data, both quantity and intensity of acidity present may be properly determined. It is Mr. Booth's contention that the mutual relationship of the respective chemical factors has an important bearing on sheet formation. He displayed graphs of pH and total acidity data from a number of paper machine white waters to show that for any particular pH value there might be a number of different total acidity values, and this, he said, indicated why reliance could not be placed solely on pH control.

The practical application of what the author calls his "chemical trim process" was indicated in his interpretation of the data contained in his paper. Although the pulp may be well beaten to

produce a satisfactory paper, the sheet may be poorly formed on the machine because of the chemical condition of the water, and it is by means of chemical adjustment at the machine that difficulties are overcome. This chemical adjustment in the case of paper formed in an acid medium is obtained by applying an alkali to the water suspension of stock just before it reaches the machine.

Mr. Booth is of opinion that the quality of water adapted for use in the beater is not as well suited to sheet formation. He said it was one of the advantages of his "chemical trim process" that one might use soft water for beaters by the addition of hydrated lime through a dry feeder to reduce the acidity to the desired extent. A double advantage is gained, for when hydrated lime is applied to a water carrying carbon dioxide and aluminum sulphate, aluminum hydroxide is produced, yielding a precipitate which has an excellent coagulating effect and thus retain effective sizing material which would otherwise be drained away with the white water.

James d'A Clark (Scott Paper Company) made an interesting contribution to the discussion of determining the pH of stock for acidity. He gave a colorimetric test providing for the use of bromocresol green. To 100 cc. of settled water a few drops of the indicator are added, followed by acid or alkali to get the required pH. The right amount of alum to be added could be readily determined in this way.

The sitting was brought to a close with an interesting display of motion pictures by the American Brass Company. These showed the production of copper, bronze and brass from the ores to the finished product.

Mill Visits and a Dinner Dance

A round of mill visitations was made in the afternoon by those who did not take part in a golf tournament, and in the evening there was an informal dinner, dance and entertainment at hotel headquarters. James A. Reilly, of the American Writing Paper Company, played for the Horace A. Moses Trophy and won with a low net of 72. F. W. Schneider, of the Hampden Paint and Chemical Company, Springfield, Mass., was next with a low gross score of 79.

Second Day's Sitting

A symposium on pulp specifications and classification was the attraction at the scientific session which lasted from 9 o'clock till 1 o'clock on Thursday. This was conducted by Dr. John L. Parsons, general chairman of the Raw Materials Division, who called upon P. K. Baird, of the Forest Products Laboratory to describe a suggested system for the characterization of pulp and stuffs based on use requirements, as drawn up by himself and R. H. Doughty, of the Forest Products Laboratory, Madison, Wis. The paper was an elaborate one containing tables of classifications intended for subsequent adoption as a standard system for papermaking materials. Consideration was given to the fact that the Technical Association is now engaged in building up a manual of test methods, and attention was consequently directed in the paper toward: (1) an analysis of pulp and stuff properties which may serve in their characterization; (2) an outline of available methods of test, and (3) a classification of these test methods with a suggested decimal scheme for their grouping under logical and proper headings.

Basic Pulp Properties Defined

Basic pulp properties included the material, and the dimensions and structure of the fibers. These three properties were taken to define and specify a pulp completely and exactly. Derived from them were the various qualities of strength, stiffness, bleachability, color, opacity and other properties, which when modified by processing and sheet structure, impart corresponding properties to the sheet. Mr. Baird said that our available information on the subject was rather meager, and no satisfactory methods of measuring either basic or derived properties had yet been established.

Among the most important of the technical properties which have been listed in characterizing pulps, twenty-one were named in the following order: bleachability, freeness, fiber dimensions; color, dirt, opacity, wetness (hydration), absorbency, penetration, tensile strength, folding endurance, tearing strength, bursting strength, stiffness, beatability, pitch content, acidity, disperse viscosity, alpha cellulose, copper number, and permanence. Each of these properties was described and discussed, emphasis being laid on the significance of their various characteristics. It was noted that much better systems of test methods were available for fibers than for papers.

A decimal system for classifying test methods was proposed by the author. This is intended to cover the properties of all materials in the industry starting with raw materials (0-999) and carrying through nonfibrous pulp material properties (1000-1999), fibrous pulp material properties (2000-2999), fibrous suspension properties (3000-3999), wet fiber mat properties (4000-4999), paper and paper board properties (5000-5999), converting materials properties (6000-6999), and use materials properties (7000-7999).

As an example of the use of this classification in expressing the required properties of pulp, a tabulation of properties which might be used to characterize a news grade of sulphite pulp was given.

The Classification of Chemical Pulps

The second paper in the symposium, by Clark C. Heritage, of the Oxford Paper Company, was also concerned with the problem of classification of chemical pulps and his contribution to the subject was of notable interest and value. A scheme for the classification of chemical pulps was suggested as a starting point for discussion and committee work, employing the following properties: color, bleachability, duration of refining action, developed strength, developed freeness and dirt.

Methods of Specifying Products—Mr. Heritage mentioned the methods in common use by which a given product may be described or specified. The more important of these are by a trade or brand name or number; by describing the raw materials consumed in making the product; by describing the processes employed to convert the raw materials to the product; by delineating the requirements of use of the product; by setting forth the properties of some further fabricated material made from the product; by stating the actual composition of the production itself, or by enumerating the properties of the product itself and placing values thereon.

The first method, that of brand or trade designation was deemed of doubtful value. The second was criticized as inadequate "if brief enough to be workable and unworkable if detailed enough to be adequate."

The Key to the Situation—The real key to the situation was said to be the use requirement of final converted paper article as consumed, use requirements to be stated in ordinary descriptive language involving only a precise and comprehensive knowledge of the manner in which the article is used and the conversion process employed to create it.

It would be possible, he said, to describe the pulp used for the paper to be employed for the printed matter by prescribing that the pulp shall be such as to meet these requirements, but obviously the jump from pulp properties to the requirements of the printed piece would be too great to be practical.

Paper Classification Should Come Before Pulp Classification — It therefore became necessary to proceed in a more rational manner step by step, first from the use requirements of the consumed article to the properties and composition of the paper of which it is made and thence to the properties and composition of the pulp employed. It was obvious that paper classification should precede and serve as the basis for pulp classification.

Some of the important requirements of paper and of the process of converting pulp to paper were enumerated. Color is regarded as very important and may be defined in terms of brightness or value, shade or hue, strength or chromo. Practical color classes should be established and defined by value, hue and chromo, beginning with magnesium carbonate at one end and proceeding by steps to some color lower than encountered in the field of hard strong kraft pulps.

Bleachability was an important property of certain pulps and may be considered as a corollary to color and hence of corresponding importance. The practical question to which an answer was desired is, What proportion of bleaching agent is necessary to assure a desired color without abnormal degradation?

Bleach Use Degradation Should Be Determined—Mr. Heritage suggested that the Fundamental Research Committee determine the bleach use degradation and end colors for pulps representative

of the entire range of those commercially bleached, before a classification be attempted. Attention should be given to establishing a maximum permissible degradation which action can be readily measured by the solubility of the bleached pulp in alkali.

The use requirements of the products made from paper demand such properties in the paper, as strength of various kinds, bulk, opacity or transparency, absorbency of various kinds, polish or lack of it, various types of surfaces, absorbencies of many kinds and degrees, stiffness or limpness, and others.

Response to Refining Action—It was suggested that since very little paper is produced from unrefined pulps, the response to refining action would be a better basis of classification as regards those paper properties secured and controlled primarily by refining than the usually determined properties displayed by test sheets of unrefined pulp sometimes referred to as "initial properties." Therefore it is necessary to assume that the response to refining action will be determined by employing test sheets produced from pulp refined in a standard manner.

Classification Offers an Official Nomenclature—In conclusion, Mr. Heritage stated that the criteria for classification suggested were believed to be in line with current mill practice and not counter to trade pariance except that reference to raw material used or process employed was omitted. The classification was believed to be capable of development to a practical tool which would be very useful in carrying on the everyday technical and business dealings of the industry.

He added that if the proposed classification did nothing more than offer an official language for those who want it, further study would be well worth while.

Replies to a Questionnaire

Chairman Parsons announced that a subcommittee on chemical pulp specifications, under the chairmanship of Miss Helen U. Kiely, had been formed. This committee had sent out a questionnaire to association members and an analysis of the inquiries received would be presented.

Chairman Parsons said the committee desired a broad discussion of the respective subjects and to this end the views of producers, consumers, importers, converters and other users of chemical pulps were invited to take part.

Miss Kiely was then called upon to present an analysis of the replies to the questionnaire.

In the classification submitted with reference to color of pulps as received, it was noted that 51 per cent of those replying used color on unbleached sulphite; 74 per cent on bleached sulphite; 44 per cent on unbleached sulphate, and 60 per cent on soda. It was recommended that color as received should be included in specifications on pulp.

As to dirt count, 56 per cent used this on unbleached sulphite, 70 per cent on bleached sulphite, 40 per cent on kraft and 58 per cent on soda. It was stated that the dirt count should be included in specifications on pulp.

A low percentage of replies came in on freeness and it was stated that the item of freeness should not be included in pulp specifications.

Freeness after refining was used by 47 per cent of those responding to the questionnaire on unbleached sulphite, 51 per cent on bleached sulphite, 37 per cent on kraft, and 33 per cent on soda. It was recommended to include data of freeness after refining in pulp specifications.

As to physical tests for initial strength of pulp, only Mullen and tear showed an average over 25 per cent and it was deemed inadvisable to include physical tests on pulp as received in pulp specifications.

Mullen and tear tests are used nearly twice as much as fold tests on pulp as refined after beating.

It was recommended to specify bleach requirement on unbleached and semi-bleached sulphite and sulphate pulps, a fairly high average of replies having been sent in on bleach requirement.

It was recommended to include the pitch content of pulp in specifications.

Miss Kiely reserved her paper, saying that the conclusions that could be based on the questionnaire had not been covered to an extent that would make the analysis worthy of serious consideration. In regard to the extent to which pulp properties are used in manufacturing, buying or selling, the replies indicated that physical tests formed the basis and must conform to established standards. It was stated that pulps could be classified more readily by physical tests than by chemical tests, the latter being of no value in the purchase of pulp.

Discussed by Pulp Importers

Johannes Westergaarde, of Atterbury Brothers, and Ernest Erickson, of Lagerloef Trading Company, Inc., discussed the papers from the pulp importers' standpoint, each giving his impressions of pulp classification and agreeing that importing pulp companies should be asked to co-operate in the work. A written discussion from an importer's standpoint will be included in a report of the symposium.

Mr. Westergaarde deemed it of great importance to develop uniform methods of testing provided they were kept within limits and have flexibility, mechanical wood pulp not to be included.

George A. Richter said it was evident that most of the classifications had been done on sulphite pulps and that the conclusions of Heritage and others did not apply to kraft pulp. He questioned the relative importance of stability as a test, saying that pulp tested today for color would differ from a pulp taken from storage a fortnight later. In addition to physical tests, stability tests should be used and provision made for new fibers of recent introduction.

Purchased by Specification

In a paper by J. J. MacDonald, of Brown Company, was discussed the "Present Status of Ability to Specify." He said that the intelligent buyer of today prefers to make his purchases on specification and he instanced the rule observed by metallurgists and producers of copper, iron, etc. There were difficulties with pulp and paper since basic wood pulp differed according to the kinds of woods used and with the woods themselves, spruce for example differing in characteristics according to the soil and climate of the region in which it is grown.

Proposed Check on Tests

Doctor Hellmuth C. Schwalbe, of the Dill & Collins Company, was invited to give his views on the general subject of testing. He said that variations in mill results depended on the different methods used. He spoke of the necessity of checking results thus an ideal method in modern testing was for the mill to make its test and have the mill and seller agree to refer the results to an independent laboratory for checking and verification, the decision of this laboratory to be final, the loser to pay costs.

Requirements of a Test Method

Chairman Parsons called attention to a paper by William R. Willets, Western Electric Company, Kearny, N. J., and Warren F. Moore, U. S. Testing Company, Hoboken, N. J., on "Requirements of a Pulp Testing Method," which would be read by title. The scope of the paper was explained by Doctor Parsons. The authors insisted that any specification for pulp should embrace two main features; (1) Detailed test methods, and (2) a method for describing results, with permissible tolerances based on actual mill practice. A review of the literature made it apparent that there are now methods of sufficient accuracy in the hands of skilled operators to permit of drawing up a set of definite pulp specifications for the various grades.

However, the authors asked, just what meaning such specifications would have; on what available data would tolerances be based? Little on this subject had appeared in the literature. The question was: "How are tolerances to be specified and on what are they to be based?" The answer was: "Actual mill practice and use requirements." Information regarding this must come from the mills, but there has been reluctance on the part of mills to publish laboratory findings and mill practice. Unless this reluctance is overcome, the framing of specifications cannot proceed far, indeed, will be definitely retarded, the authors said.

The position of pulp suppliers, both domestic and foreign was stated. They would be glad to see specifications formulated, as it would assist them in their sales work. It would permit them to designate definitely a given pulp as suitable for book, newsprint or any other grade of paper.

Measuring Pulp Colors

Chairman Parsons asked Mr. Baird to give a summary of his experience with pulp color measurements at the Forest

Products Laboratory. Mr. Baird said that the Ives Tint Photometer had been used there for the past ten years, though it was not as scientific an apparatus as some of the later instruments. The estimation of color in pulp is surrounded with greater difficulties than in the case of paper and one of the first efforts of the association should be directed toward the standardization of an instrument for the measurement of color.

A Definition of Color

Chairman Parsons gave a definition of the term color and touched briefly on its attributes. He said that color cannot be reduced to terms of any purely physical conception as it belongs in a psychological category. He mentioned the three attributes of color as Brilliance (luminosity, brightness, tint, value, visual brightness); Hue, an attribute of certain colors by which they differ characteristically from the gray of the same brilliance and which permits them to be classed as reddish, yellowish, greenish, or bluish; Saturation (purity, chroma). He called attention to an article on "Color Specification in the Pulp and Paper Industry," by W. B. Van Arsdel, which was presented originally at a meeting of the Optical Society of America in New York, February 26, 1931, and reprinted in the *Paper Trade Journal* for August 11, 1932.

Brown Company's Method of Colorimetry—At the request of the chair, Mr. Richter, of the Brown Company, gave an explanation of the methods of color measurement originally used in the Brown Company laboratory, together with an account of the modifications subsequently employed. Six flat disks, each about 8 inches in diameter were rotated simultaneously. The recessed faces of the disks were filled with varying mixtures of plaster of Paris, potassium chromate and magnesium carbonate. Disks of pulp 3½ inches in diameter were attached to the faces of the wheels so as to be whirled with them. The entire series of wheels was illuminated by a standard daylight lamp or battery of lamps. The pulp was then specified by the number of the wheel it most closely matched. Instead of using magnesium carbonate, as originally employed by R. B. Wolf, pure plaster of Paris or calcium sulphate made by a special process was used without magnesia, the yellow color being obtained with zinc chromate applied as a definite sector of the wheel instead of being mixed with the plaster as was done by Wolf with potassium chromate. This method was found to be satisfactory for bleached sulphite pulp, but did not work so well with the new types of purified wood fiber originating from kraft instead of sulphite pulp.

An Electric Color Comparator—Dr. L. C. Lewis, of the Mead Corporation, was invited to discuss the General Electric color comparator. He brought out two points: (1) the electric eye used in this instance should replace the human eye; (2) a great deal remains to be done by the association in standardizing one definition or a few definitions of color that had not been completed, namely as regards the manner of illuminating and viewing.

Rag and Sulphite Pulp Compared

"The Relative Stabilities of Rag and Purified Sulphite Pulps" was the title of a somewhat lengthy paper by Prof. Harry F. Lewis, of the Institute of Paper Chemistry, Appleton, Wis., which brought the scientific sitting on Thursday to a close. For a year and a half, the staff of the Institute of Paper Chemistry has occupied itself making analyses, and preparing the way for deductions pertaining to the relative stabilities of rag and purified sulphite pulps. Professor Lewis reserved his paper for later publication, presenting only a summary of the data which have been gathered and an indication of the tentative findings toward which the staff of the institute has been moving. He said that definite conclusions must wait upon the acquisition of further data and the development of other technics. By means of diagrams and lantern slides he illustrated the latest concepts in regard to the nature of cellulose.

Smoothness Measurer Exhibited

On exhibition in one of the anterooms was an instrument for measuring the smoothness and porosity of paper, the invention of Dr. Julius Bekk, of Ullstein Printery, Berlin, an instrument which is marketed in this country by R. Fuess, Inc., 245 West 55th Street, New York. This attracted the interested attention of many members of the Technical Association who were impressed with the extremely sensitive measurements of smoothness and porosity made possible by it.

Unusual Entertainment at Smoker

There were more mill visitations on Thursday afternoon and another golf tournament in competition for the S. L. Willson trophy, which was won by M. W. Davis, of Montreal. In the evening, the members gathered in the Nonotuck Hotel ballroom for a smoker and entertainment which was presided over by Former President George E. Williamson, with a well known local entertainer as master of ceremonies. Mr. Williamson announced the names of those present who had attended the fall meeting of the association fifteen years ago, in September 1917 and introduced the erstwhile secretary of the association who sat at the head table. Mr. Williamson had before him a bound volume of *Paper*, the original journal of the association, and gave a summary of the proceedings, calling attention to group and individual photographs of members. Following this, Walter Moynihan, master of ceremonies, took charge and announced the entertainment feature of the evening. The center of the ballroom was occupied with a regulation prize ring in which a number of papermaking questions that have agitated paper circles for a number of years were to be settled by champion boxers and wrestlers.

The questions "argued" in the ring were: (1) Is papermaking an art or a science?; (2) Is 65 per cent relative humidity better than 50 per cent relative humidity?; (3) Is alpha pulp as good as rag?; (4) Is the chemist or the engineer the most valuable to the pulp industry?; (5) Is domestic pulp better than foreign pulp?; (6) Is Holyoke or Kalamazoo the better "Paper City"?

The first five questions were fiercely contested. The results were so close that Ernie Rosseau, the referee, and Henri Lafontaine, the announcer, were unable to agree on a verdict. The last question, however, relating to the greatness of Holyoke and Kalamazoo as paper cities was a one-sided victory for the former and Holyoke once more rules as "The Paper City."

Closing Sitting, Friday

The closing sitting was opened promptly at 9 o'clock on Friday morning by President Abrams, who called on Dale S. Davis to present his paper on "Alignment and Line Coördinate Charts." In this contribution, two graphical methods of calculating were presented. One of these, the alignment chart, dealt with the calculation of bleach consumption as bleach liquor and concentration of chlorine in the bleach.

A line coördinate chart differs from an alignment chart by being an arrangement of three axes, two of which are parallel, while the third is generally a somewhat erratic curve. Mr. Davis illustrated a line coördinate chart dealing with the determination of solids in waste sulphite liquor. References to the literature of alignment charts were given, THE PAPER INDUSTRY (xiii, 9, p. 1101; 7, p. 859; xiv, 1, p. 36), being quoted on charts to determine calender roll weight, the length of paper in a roll, and the measure of paper drying, respectively. Mr. Davis instanced a paper by Ravenscroft in *Industrial and Engineering Chemistry* (xxi, 12, p. 1203), as constituting an excellent discussion of the mechanics of line coördinate charts.

Chrome-Nickel-Iron Castings

There was no discussion of Mr. Davis's blackboard exhibition of alignment chart designs and he was followed by J. D. Miller, chairman of Materials of Construction Committee, who reviewed the proposed T.A.P.P.I. specifications for chromium-nickel-iron castings for sulphite pulping equipment. This was a preliminary report which gave a summary of the important conclusions reached by the committee in regard to the examination of castings, for the purpose of eliciting criticism and discussion. A number of literary references were given on articles dealing with the characteristics of alloys as determined by the relative quantities of chromium and nickel desirable to incorporate with the iron to insure adequate resistance of sulphite pulping equipment to corrosion.

In a review of the experience of producers of alloys determined by the results of a questionnaire, particulars were given of the tonnage of alloy castings used for sulphite service, as well as the analysis of the most satisfactory material produced, with figures on chro-

mium, nickel, carbon and iron contents, plus other elements present in appreciable proportions or added for specific purposes. These and other particulars developed from the questionnaire were of chief interest to producers of alloys, but served the purpose as well of enabling the committee to draft tentative specifications for chromium-nickel-iron castings.

Then followed details of specifications covering chromium-nickel-iron castings used for sulphite pulp processing, such as relief valves, strainers, pumps, digester fittings, etc. Thirteen specifications were enumerated and described, under such headings as purchase basis, chemical composition, heat treatment, workmanship and finish.

In a supplementary note, the observation was made by the committee that the presence of molybdenum in a chromium-nickel-iron casting was not essential, though it might be advantageous.

The committee acknowledged the cooperation it had received in its work from a number of steel manufacturers.

Committee's Findings Interestingly Discussed—A long discussion was carried on by members and representatives of steel and other equipment companies. E. C. Jones, of the Lebanon Steel Company, was of the opinion that the chromium content should be raised to 18 in Type A and 8 of nickel. A member said that a maximum of 65 per cent iron, 18 per cent chromium, and 8 per cent nickel would be right. Mr. Brauns, of the Duriron Company, objected to any composition that would rule out 18-8 with a low carbon alloy. He objected to the specifications recommended by Mr. Miller for the reason that it would confine the alloy to the products of two companies. The complaint was made that the committee had set the limits too close. A number of suggestions were made for changes in the tentative specifications which Chairman Miller said would be taken into consideration by the committee. He assured producers of chrome-nickel-iron alloys that he would give every consideration to their suggestions and embody them in a report for the annual meeting next February.

Physical Hydration Versus Chemical Hydration

W. Boyd Campbell, research chemist, Forest Products Laboratories of Canada, was called on to present his paper on "A Physical Theory of the Beating Process," which he did in abbreviated form.

Mr. Campbell undertook to show that the change which takes place in the beating of pulp to give it a mucilaginous appearance with a slimy or greasy feel while wet, is not the result of a chemical combination of water with the cellulose, but is rather the result of a physical affinity of cellulose for water. This affinity is heightened whenever cellulose is subjected to the action of jordans, refiners, hydrators, stockmakers, rod mills and the like which effect fibrillation. Mr. Campbell gave explanations on this basis to account for slowness, greasy feel, and water-holding character, for shrinkage and increased density of the dried sheet, for increased tensile and lowered tear strength, for increased transparency and for increased depth of color in dyeing. Stated briefly, the hypothesis put forward by him in opposition to the claims of certain colloidal chemists and others is that the bonding of fibers in a sheet is due to the beating causing a greater facility of contact between fiber and fiber which, being drawn into contact by surface tension effects, unite by their mutual molecular attraction or crystallizing forces.

Mr. Campbell is well known for his work on the physical characteristics of pulps and the arguments put forward by him in favor of a physical theory of "hydration" as generally understood by practical paper manufacturers were of much interest and convincing. He drew attention of the position occupied in a paper mill by the beaterman before the advent of the chemist, and suggested that even yet the preparation of stock for paper remains an art of which the scientific principles are only now beginning to be understood.

As a chemist himself, Mr. Campbell confessed that in the light of researches of the last few years, the chemist has been responsible for creating one false idea with regard to the beating process. Such a term as hydration was not known to the old-time beaterman. That was introduced by the chemist who felt the need of something more than a physical interpretation of the striking alteration produced. The slimy feel of the pulp, its reluctance to part with its water and the increased tendency to dry to a hard, horny and nearly homogeneous mass suggested to the chemist that there had been produced something akin to a glue or a mucilage which could bind together the unchanged cellulose fibers. It was natural to assume that such mucilage must be formed by the union of cellulose and water, for these were the only possible components. So the beating was assumed to bring about the production of this material by the hydration of some of the cellulose. An equally natural step was to refer to pulp in this condition as hydrated pulp. As in many other instances, putting a name to the phenomenon obscured the fact that it was still as far from explanation as ever; in this case, even farther away because the term hydration has a fairly definite chemical meaning and present evidence is to the effect that beating does not cause any change in the degree of hydration of pulp if we are to attach to the term any of its usual meanings.

That cellulose pulps do ordinarily contain water of hydration, the amount of which is not affected by beating, is the conclusion reached by Mr. Campbell.

An Engineering Study of Beating

Arthur B. Green, consulting engineer, Needham, Mass., contributed a study of beating from the engineering standpoint. He is well known as the inventor of the beater drag for determining and standardizing the beating cycle, as well as other instruments for determining the slowness or freeness of pulp. He has now apparently invented an apparatus to displace or provide a substitute for the open-tub beater, the essential principle of which is a provision for mechanical action, different from that to which the stock is subjected in its passage through the ordinary beater or Hollander. This he terms "impact against surfaces," and a violent impact, developed from a form of centrifugal. With this there is said to be a low expenditure of power and a high development of tearing strength and folding strength in the stock. A point made for the new apparatus was that upkeep is low, seeing that there is no metal-to-metal contact, not even as much as hydraulic shear, to consume power and produce wear.

An Explanation of Beating

Both of the preceding papers were discussed together. James d'A Clark praised Mr. Campbell's paper and offered a simple explanation of beating as being dependent on the formation of a gel. He asked if there was any work being done to determine whether a gel was formed. To this, Mr. Campbell replied that cellulose fibers themselves were gels, and as for internal fibrillation which had been mentioned, this was in effect a swelling induced by a separation of the crystallites. Until we know all about what takes place in the beating of fibers, papermaking will remain an art and not a science.

pH Determinations in Presence of Chlorine

Discussion was invited on the paper by Lewis and Kukolich, preprints of which had been supplied. This had to do with the colorimetric determination of pH of solutions containing chlorine or hypochlorites and the stability of the indicators. The work had been carried out in order to make available the data concerning the action of chlorine and hypochlorites on colorimetric pH indicators. There was no response to the call for discussion and John D. Rue was invited to give a summary of the paper prepared by himself and J. S. Sconce, of the Hooker Electrochemical Company, on "Direct Chlorination as an Aid in the Bleaching of Sulphate Pulp."

Direct Chlorination of Sulphate Pulp

The paper by Rue and Sconce on the direct chlorination of sulphate pulp discussed a number of variables of the rate of chlorination and the effect of chlorination on the physical and chemical properties of the pulp. Temperature and consistency variations only moderately modified the rates of reaction. The addition of lime after five minutes speeds up the rate of reaction and prevents serious chemical and physical degradation of the fiber.

A two-stage bleaching process was described in which the first stage consisted of a chlorination with lime after five minutes of reaction followed by a wash. The second stage was an ordinary calcium hypochlorite bleach. This process, developed in the laboratory,

has been placed in commercial operation and satisfactorily produces strong soda-white pulps. Details of the equipment were described and illustrated by means of lantern slides.

The following other papers were listed and read by title: The Bleaching of Kraft Pulp, by Francis J. Cirves, chemist to the Filer Fibre Co., Filer City, Mich.; Temperature Curves and the Sulphite Cook, by Ragner Monnberg, superintendent of control department, Abitibi Power & Paper Co., Ltd., Smooth Rock Falls, Ont.; The Fiass Electrode in pH Determinations, a contribution from the Institute of Paper Chemistry, by E. H. Voightman, graduate student, and B. W. Rowland, professor of colloid chemistry.

Entertainment and Inspection of Machinery Plants

The visitors left in the afternoon by motor cars for Hampton Ponds where an old-fashioned New England clambake was served at Couture's Grove. The recreational program was an elaborate one and included provision for the women in attendance, sightseeing trips, luncheons and other entertainment being offered on a lavish scale.

In addition to visits to paper mills, invitations were received from engineering and mill equipment plants which were taken advantage of by many in the party. In this way the plant of the Norwood Engineering Company at Florence, Mass., was visited for an inspection of equipment that included calenders, dusters, platers and folders, besides numerous types and sizes of filtration plants. One of the most interesting visits of this kind was paid to the plant of E. D. Jones & Sons Company, Pittsfield, Mass., on Thursday afternoon. A new type of inward flow screen attracted the interested attention of the visitors, besides a whole range of beaters from miniature laboratory size to full mill type, including the Jones High-Speed Beater, which was shown in cross section to illustrate its construction. Jordan engines of the adjustable shell type, jordan fillings and numerous other varieties of paper mill machinery were seen and studied by the visitors.

◆ Kimberly Memorial Dedication

On September 21, just 80 years after J. A. Kimberly first attended classes at Lawrence College, Appleton, Wis., there was dedicated to his memory a $100,000 library and laboratory at the Institute of Paper Chemistry, affiliated graduate school, a gift from his son, James C. Kimberly, Neenah, Wis., prominent paper manufacturer.

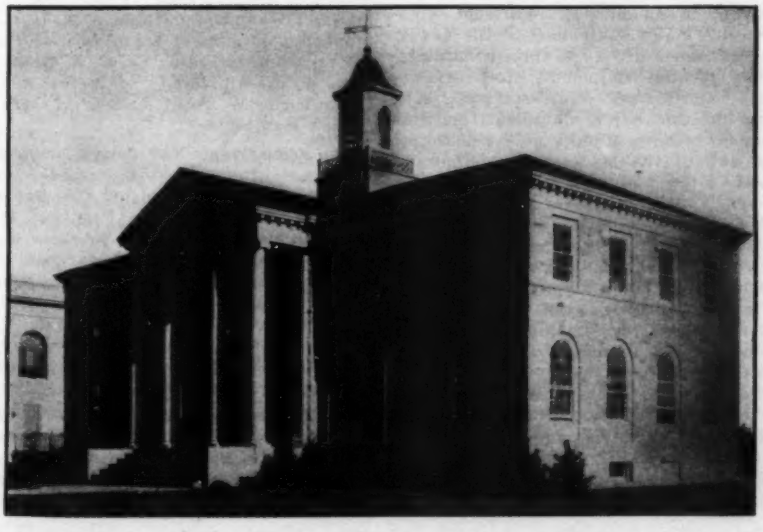
J. A. Kimberly was for several years a trustee of the college. The dedication program was held jointly with the matriculation day exercises at Lawrence with Dr. Henry M. Wriston, president of the college and director of the Institute, as principal speaker.

Just one year ago, the first unit of the Institute, a $250,000 building complete with equipment, was dedicated. It is regarded by American industry as a most significant development in education and drew the praise of President Hoover and Julius Klein as the kind of co-operation needed between industry and colleges. The Institute draws support from more than 250 mills and corporations throughout the United States.

J. A. Kimberly was a pioneer paper manufacturer in the Fox River Valley, center of the industry in the middle west, and was for 56 years president of the Kimberly Clark Corporation, operators of extensive holdings in the United States and Canada. He died in 1928.

Presentation by J. C. Kimberly was to Ernst Mahler, president of the Institute board of trustees. The new building, of colonial design, will house, in addition to the library, the colloid chemistry, wood technology, and optical laboratories.

There are enrolled this year 35 students, graduates of 22 different colleges and universities throughout the United States. They have been selected from more than 200 applicants.



◆ New Catalogues and Publications

Carpenter Steel Co., New York—This manufacturer of welded stainless steel tubing has put out its first piece of literature on the subject. General information on the tubing, together with its physical properties and working instructions are given in the folder.

General Electric Co., Schenectady, N. Y.—Two new publications just issued by this company will be of interest to paper mill engineers and executives. Pulp- and Paper-mill Pump Motors and Control, GEA-1633, and Motors and Control for Paper-mill Screens, GEA-1634, outlines and illustrates pulp and paper-mill applications for squirrel-cage, wound-rotor and synchronous type motors. A number of illustrations show motors driving paper-mill equipment.

Gleason Works, Rochester, N. Y.—A booklet entitled Engineering Data on Large Hypoid Gears, has been prepared to bring to the engineer in compact form the essential data required for use of spiral bevel and hypoid gears. There is unquestionably much interesting data for both the purchasing and engineering departments—information on the design, application, efficiency, speeds and horsepower transmission of these two types of bevel gears, besides standard specifications.

B. F. Goodrich Rubber Co., Akron, Ohio—Acidseal Paints is the name of a manual of recommendations for paint problems which tells about rubber derivatives that minimize the corrosive action of acids and alkalies on materials. The bulletin discusses selection of proper paint and primer for various purposes, methods of application, ingredients, describes finished results, spreads per gallon and operations in which different types have been used successfully.

Harris Seybold Potter Co., Cleveland, Ohio—A rather complete treatise on the subject of Commercial Printing by Offset has been published by this company in booklet form. Paper manufacturers will be especially interested in the chapter headed Advantages in Paper. William Guy Martin, the company's Chicago District Sales Manager, is the author of this booklet.

Link-Belt Company, Chicago—An illustrated catalogue on steel chains has just been completed by this company, in which information on the older chains is brought up to date, and many new and useful sizes are offered for the first time. Many attachment links are shown for elevating and conveying work; and a comprehensive line of sprocket wheels has been included, enabling the user to select suitable sizes of sprockets for the work to be done. Copies of this No. 1192 may be obtained from the company's office at Indianapolis, Ind.

The Permutit Company, 440 Fourth Ave., New York—A very complete booklet just published is entitled No Scale, No Sludge, No Mud—The application of Zeolite Water Softeners to the treatment of Boiler Feed Water. The booklet is profusely illustrated with photographs and diagrams and contains tabulated data, analyses, conversion tables, etc. Copies upon request.

Riley Stoker Corp., Worcester, Mass.—The new Model "R" Riley Super-Stoker is the subject of a new catalogue just received from this company. A brief description of the stoker operation is given and its distinctive features enumerated. The book is profusely illustrated and has some diagrammatic color plates.

Warren Steam Pump Company, Inc., Warren, Mass.—A bulletin known as No. 202-2 covers Warren Stock Pumps for pulp and paper mills. This publication contains some very interesting material, including friction loss curves and other data, a tonnange conversion chart, and a sectional illustration of the pump in colors.

◆ Paper Production for the First Seven Months of 1932

According to identical mill reports to the Statistical Department of the American Paper and Pulp Association, production of paper was approximately 15 per cent below the level of the corresponding seven months of last year and inventories were 5 per cent smaller than a year ago. All major grades showed decreases. Production was in fairly close balance with demand in most grades as evidenced by the fact that almost all stocks were below last year's level.

For the first seven months of 1932 the production of wood pulp was approximately 16 per cent below the level of the first seven months of 1931, according to identical mill reports. Both the amount of pulp consumed by producing mills and the amount shipped to the open market showed substantial decreases from a year ago, the former being 14 per cent below the level of the first seven months of 1931 and the latter about 22 per cent less. Shipments of soda pulp to the open market were 41 per cent smaller than for the first seven months of 1931, while shipments of news grade sulphite and groundwood diminished 24 per cent and 36 per cent, respectively. Shipments of bleached sulphite to the open market were 35 per cent smaller. Kraft pulp shipments to the open market were 1 per cent smaller than during the seven months of 1931 while the amount consumed by producing mills was 20 per cent less than during the first seven months of 1931.

At the end of July, stocks of pulp on hand at producing mills were below the level of a year ago in the case of groundwood, bleached sulphite, kraft and soda pulp. All the other grades showed increases in inventories.

◆ Announce Proposed Merger of Mosinee and Tomahawk

On October 1, announcement was made by A. P. Woodson, president of the Mosinee Paper Mills Co., Mosinee, Wis., that negotiations are under way for the merger of the Mosinee company and the Tomahawk Kraft Paper Co., Tomahawk, Wis.

It is estimated this consolidation will bring together aggregate assets of around $8,000,000. Both companies manufacture kraft paper.

The Mosinee company owns over 200 acres of ground at Mosinee on which it has a plant with a daily capacity of 100 tons of paper. It also owns a hydro-electric station which supplies three-fourths of the power used by the plant. Another asset of this company, which is very important, is 37,000 acres of virgin timber in Michigan which insures a future supply of raw material. The Bay West Paper Company is a subsidiary.

The Tomahawk company has a mill at Tomahawk and owns water power sites on the Wisconsin River near Tomahawk at Grandfather Falls and at Nigger Island. The terms of the proposed merger have been sent to the stockholders for approval. The directors believe that a consolidation will result in a stronger financial situation and more efficient operation of the plants of the two companies.

◆ Michigan Company Gets Campaign Orders

The presidential campaign has brought a demand for articles made of wood pulp which has resulted in the reorganization of the Burwood Carved Products Co., Owosso, Mich.

The company makes a wide variety of articles out of wood pulp from hand-carved dies. It has received orders from the Republican National Committee for two million Hoover Charms to be worn tied to the coat lapel during the campaign, also an order from the Democratic National Committee for one and a half million "happy days" tokens.

◆ Southern Kraft Resumes Operation at Moss Point Mill

On October 1, the Moss Point, Miss., kraft mill of the Southern Kraft Corporation was reopened, after having been closed since January.

Officials of the company gave two reasons for resuming operations at this plant: first, a desire to relieve the present unemployment situation; second, the increased demand for kraft paper, which has risen gradually of late, although the price is not so good.

The closing of the mill in January threw about five hundred men out of employment and caused much hardship on those families which depended entirely on the mill for support. Four hundred men have been returned to work with the opening of the plant.

◆ Bogalusa Paper Company Plans Improvements

The Bogalusa Paper Company, Bogalusa, La., has announced plans for improvements and the installation of new equipment to cost approximately $1,250,000.

The contemplated improvements will consist of new type recovery units, which will permit taking advantage of waste heat for generating steam and the saving of chemicals; additional high presure boiler equipment in the power house; one 7,500 kv.-a. turbo-generator; lime burning equipment; stock save-all and water storage; additional pulp washing and thickening equipment; machinery for refining of pulp, and a rebuilding of two of the six paper machines to make a new and improved type of board.

The United Engineers & Constructors, Inc., of Philadelphia, Pa., have been retained as consulting engineers, and they have for the past several months been working on plans for new and original designs which are somewhat of a departure from regular sulphite mill practice.

Contracts have already been let to the Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa., for the turbo-generator; The Babcock & Wilcox Co., New York, for boilers; Mount Chemical Equipment Co., Lynchburg, Va., for lime-burning equipment, and the Dorr Company, New York, for water and stock save-all system. Contracts and orders for the balance of the equipment are to be placed shortly.

The company feels that now is an auspicious time to proceed with these improvements in order to effect economies in manufacture, to conserve natural resources, and to do its part to stimulate business. The responsibility for these improvements is in charge of A. Suter, general superintendent, under the direction of M. E. Cody, general manager. It is expected the work will be completed within six months.

◆ Kraft Liner Board Prices Increased

Southern Kraft Corporation, a division of International Paper Company, announced on September 23 a minimum advance of $2.50 per ton on kraft liner board prices. On account of the recent competitive situation in some markets the advance will be more pronounced in those territories. This marks the first advance in container board prices in more than eighteen months.

Southern kraft liner board manufacturers are running 100 per cent capacity due to the increasing demand for their product.

The total annual output of container board is in excess of two million tons and the value of merchandise shipped in fibre board containers is several billion dollars.

◆ Divisional Meetings of Superintendents

A number of interesting meetings of the divisions of the American Pulp and Paper Mill Superintendents Association have been scheduled for October.

Miami Valley Division—The first meeting of the season was held October 1 at the Hamilton Inn, Franklin, Ohio. C. H. R. Johnson of the Downingtown Manufacturing Co., and A. F. Francis of the Chromium Corporation of America, were the speakers. New officers were elected for the ensuing year.

Northeastern Division—On the same date, this division held its fall meeting at Hotel Waumbeck, Jefferson, N. H. A number of prominent speakers were on the program, including Dr. C. A. Brautlecht of the University of Maine, and Hon. Charles W. Tobey, former governor of New Hampshire.

The Pennsylvania-New Jersey Division—A good attendance was recorded at the meeting of this division October 8, at the Hotel Benjamin Franklin in Philadelphia. Well-known speakers on the program were: E. C. Gildenzopf, of the Schmidt & Ault Paper Co.; C. E. Ellis, Downingtown Manufacturing Co.; D. R. Francis, Waterbury Tool Co.; F. C. Farnsworth, of the Farnsworth Co. Past President James G. Ramsey acted as toastmaster at the banquet meeting.

Northwestern Division—The two-day meeting of this division was held at the Hotel Duluth, Duluth, Minn., September 16 and 17. Short business sessions were held in the mornings, with a dinner

meeting at the close of the first day. The visitors made a tour of inspection through the plant of the Northwest Paper Company at Cloquet, Minn., on the afternoon of the first day; the second day, an interesting trip to the Cloquet forestry station.

Michigan Division—An interesting program is being prepared for the first monthly meeting of the current fiscal year, which will be held October 20 at the Columbia Hotel, Kalamazoo, Mich.

◆ AT SAINT JOHN, N. B., the Port Royal Pulp and Paper Company is rehabilitating the Union Point Pulp and Paper mill, formerly operated by the Nashwaak Paper Company, and when the work is completed, a high production capacity of 125 tons of high grade bleach sulphite is expected to be reached monthly.

◆ OFFICIAL ANNOUNCEMENT has been made that the Carlyle Paper Company, Carlyle, Ill., will be reopened October 15 with a twenty-four hour daily operating schedule. About eighty men will be put to work in the plant, which has been closed since May 15.

◆ Research on Paperboard Containers at Mellon Institute

Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research, Pittsburgh, Pa., has announced the renewal of the Robert Gair Fellowship for research on moisture-proofing and grease-proofing paperboards for cartons and boxes. The fellowship was established in 1931 by the Robert Gair Company, Inc., of New York, for the purpose of developing improved moisture-proofing and grease-proofing qualities in paperboards, used for boxes, to keep pace with the advances made in package merchandising.

Several notable improvements have already been made available to the industry as a result of the researches of the Gair Fellowship, Dr. Weidlein said in making the announcement. Among the most important is the development of a new adhesive for joining difficult-to-paste materials, as, for example, highly waxed paperboard and moisture-proof sheet cellulose. Particularly in the food industries, Dr. Weidlein said, it is frequently desirable to use a carton made of a wax-coated paperboard. When it was sought to improve the merchandising qualities of such a package by providing an inner liner of sheet cellulose or a transparent cellulose window, the problem of a satisfactory adhesive was at once apparent. Dr. Marion D. Coulter, who has conducted the scientific studies under the Gair Fellowship, succeeded after a few months in perfecting an adhesive for this purpose that is now in actual use.

The work done under the Gair Fellowship has also resulted in the development of another adhesive for sticking one waxed surface to another. Both of these improvements are of great importance because they make available to package users a great many types and styles of packages which could not be used heretofore because of the difficulties involved in their production owing to the lack of a satisfactory adhesive.

The work of the Gair Fellowship for the ensuing year will be devoted to the major problem of developing moisture-proof and grease-proof coatings for paperboards. Dr. Coulter is to continue in charge.

◆ Rosin-Wax Sizes in Coating Paper Stock

In coated paper and boards, two things should be considered: the paper stock which serves as a base and the coating mixture applied on the surface. The latter may be likened to a paint and, like paint, is constituted by a vehicle and a pigment.

As implied by its name, the vehicle serves to carry the finely divided particles of the pigment so that they may be applied more easily to the surface of the paper. Water, except in a very few cases, is the vehicle used. An adhesive is generally dissolved in the water to bind the pigment to the paper, once the water has been evaporated. Casein is the most commonly used adhesive for that purpose, but starches, such as feculose, and glue, are also resorted to where the strong odor of casein is objectionable (hanging and wall papers, for instance).

The prerequisites of a good pigment are fineness of grain, covering power, opacity, color, absence of grit. Clay, calcium sulphate, calcium carbonate are the basis of most pigments for coating mixtures.

If we consider that, after evaporation of the water, the casein forms a brittle film or bond and that the pigment particles encased in it remain in a discontinuous phase, we will soon realize that, from such materials, it is practically impossible to obtain a flexible coating that will stand folding. The addition of emulsified waxes or fatty acids to the coating mixtures has proved of some help, in many instances, in reducing the amount of cracking and scaling off of the coating.

But the solution of the problem does not lie entirely in improving the flexibility of the coating alone. The character and physical properties of the paper stock have also a very definite relation to those of the finished product. The kind and quality of pulp used, the beating and refining treatment given to the fibres, the amount of filler added, the method and degree of sizing, will all affect the pliability and other properties of the paper. Assuming all other factors to remain the same, the method and degree of sizing offer great possibilities for improvement.

In general, coating paper stock is medium sized. It is hard to define exactly the degree of sizing thus referred to. If the paper stock is soft sized, it absorbs too much casein. The result is an increased cost, and reduced pliability. The paper stock is hardened by the absorbed casein and the quality of the bond between the pigment particles is decreased. If the paper is too hard sized, the casein does not penetrate sufficiently into the paper and there is insufficient adhesion between the pigment particles and the fibres.

It has been demonstrated that the use of rosin-wax sizes in coating paper stock materially improved the pliability of the coated paper. Wax in itself is not as brittle as rosin and while rosin hardens the paper, wax softens it. Wax acts like a lubricant, while rosin has adhesive properties. Mixtures of the two, in the right proportions, will give the desired pliability, without otherwise affecting the strength of the paper. As rosin-wax sizes are 30% to 35% more efficient than rosin size, less size is required to obtain a given degree of sizing and consequently less alum is needed.

Greater water resistance can also be obtained with rosin-wax sizes, than with rosin size, without impairing the pliability of the paper stock. By increasing the degree of sizing (within certain limits), it is possible to reduce the absorption of casein by the paper to a minimum, thereby increasing the strength of bond between the pigment particles and the fibres, and also decreasing the hardening effect of the casein on the paper. The final result will be a more pliable coated paper.

◆ KIELEY & MUELLER, Inc., New York City, has appointed F. G. Hartley Co., Perkins Bldg., Tacoma, Wash., agents for its full range line of pressure control devices and allied specialties in the Pacific Northwest.

◆ THE NEW YORK State Economic Council has announced the election of its board of directors, among which appear the names of Ledyard Crosswell, Jr., chairman of the board of the A. P. W. Paper Co., Albany, and R. P. Gould, Gould Paper Co., Lyons Falls.

◆ John C. Cunningham

John C. Cunningham, paper finishing machinery salesman and paper specialist for B. F. Perkins & Son, Inc., passed away suddenly September 28, at the age of sixty years.

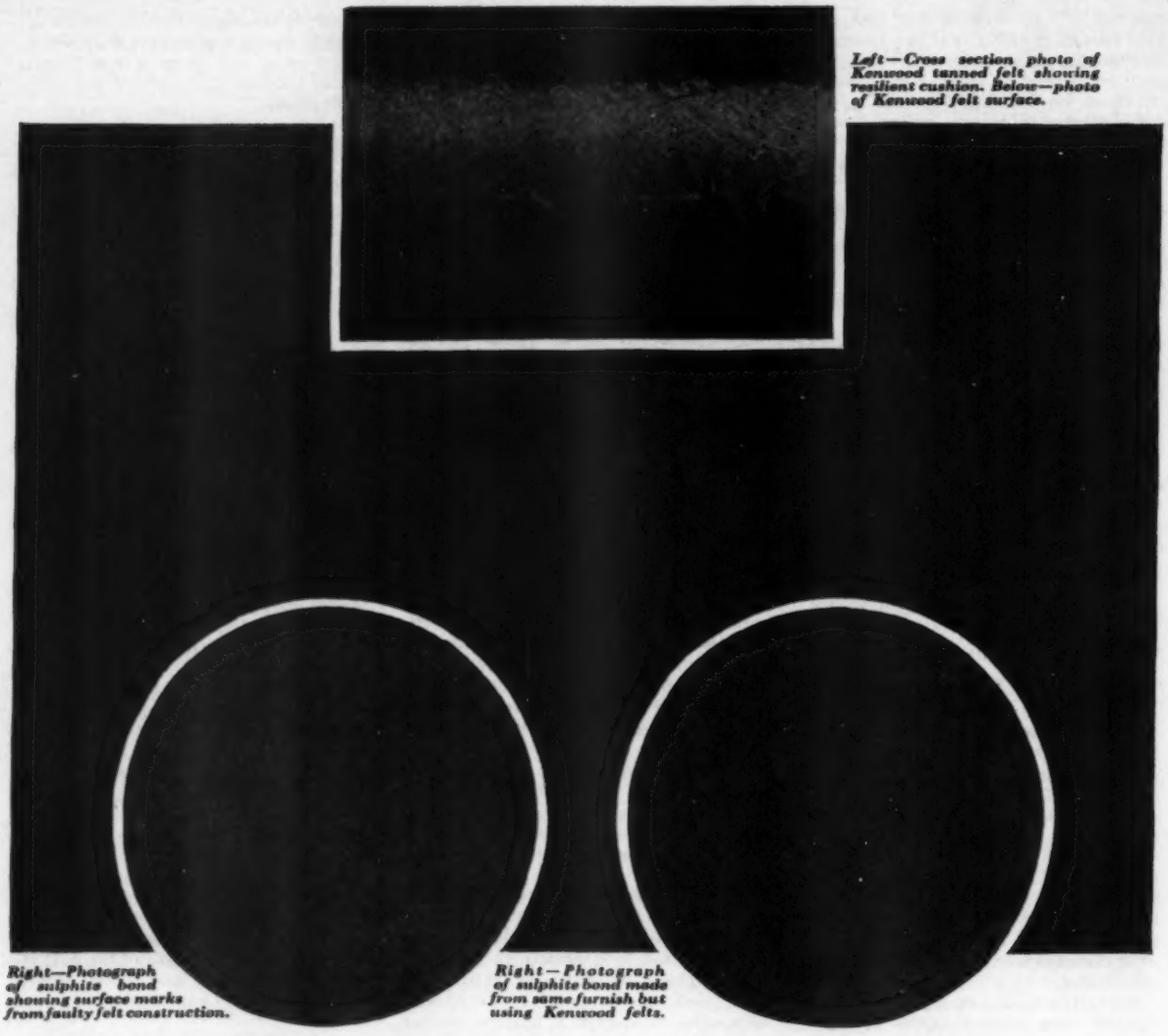
Mr. Cunningham entered the employ of Russell Paper Company as a boy, working in the office and on the paper machines. In 1902 he became associated with the Champion International Company when it was organized, serving as calender foreman, and later as coating mill superintendent until 1917, when he was given charge of the finishing room. In 1923, he left Champion-International to become associated with B. F. Perkins & Son, Inc.

A wife, daughter and son survive.

◆ Mrs. Thomas J. Keenan

THE PAPER INDUSTRY is deeply sorry to record the passing of the wife of its Contributing Editor, Thomas J. Keenan, New York City.

Although she had not been in the best of health for some months, Mrs. Keenan was ill only about a week prior to her passing on Sunday, October 2nd.



Left—Cross section photo of Kenwood tanned felt showing resilient cushion. Below—photo of Kenwood felt surface.

Right—Photograph of sulphite bond showing surface marks from faulty felt construction.

Right—Photograph of sulphite bond made from same furnish but using Kenwood felts.

SUPERIOR FINISH

The deep, cushioned surface of a Kenwood Tanned Felt possesses two qualities that are distinctive and vitally interesting. First, there is depth and resiliency that preclude any imprint upon the sheet. Second, the Kenwood Felt is made of the strongest and liveliest of choice wools that maintain this cushioned texture through miles and miles of high production life. These features all go back to the sound Kenwood manufacturing equation: Selected stock—plus meticulous exactness in yarn—plus scientifically correct design—plus Kenwood patented tanning processes equal maximum felt performance at minimum felt cost.

KENWOOD WOOL PRODUCTS

KENWOOD *tanned* FELTS

F. C. HUYCK & SONS

KENWOOD MILLS, ALBANY, N. Y.

KENWOOD MILLS LTD., ARNPRIOR, ONTARIO, CANADA

POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Causes of Sparking on Commutators

Causes of sparking on commutators are numerous and it is often due to a combination of conditions, or to conditions external to the machine itself. The most common conditions to which sparking is due are fairly well understood but, in many cases, sparking is the result of negligence on the part of the attendants. Among the more common conditions conducive to sparking may be enumerated the following: (1) Overload; (2) Sudden changes in load; (3) Incorrect position of brushes, i.e., not set in exact neutral plane; (4) Unequal spacing of brushes; (5) Brushes not fitted exactly to the commutator; (6) Improper kind of brushes used; (7) Rough or pitted commutator; (8) Loose commutator bars; (9) High mica; (10) Insufficient brush pressure; (11) Oil or dust on the commutator; (12) Weak magnetic field; (13) Vibration of machine or ground; (14) Broken circuit or ground in the armature.

Sparking due to the brushes not being set at the neutral point may be tested by shifting the brushes back and forth on the commutator. The condition is easily remedied by shifting the brushes in the above manner until sparking is reduced to a minimum.

Proper and sparkless operation of generators requires equal spacing of the brushes. If improperly spaced, they may be adjusted as follows: Take a piece of paper several inches wide and of the same length as the circumference of the commutator and measure and mark it into the same number of equal spaces as there are brush holders. Then place the paper around the commutator under the brushes and shift the brush arms so that the toes or heels of each set of brushes are exactly on a mark.

The brushes must be carefully fitted to the commutator. This may be accomplished by drawing a strip of sandpaper between them and the commutator or by pasting an endless band of sandpaper around the commutator and then slowly revolving the armature by hand or power.

Another requirement essential to obtaining sparkless commutation is the selection of the proper kind of brushes to conform to the operating conditions. The brush should be homogeneous and the current density in the brush tip should not become excessive. For undercut commutators, the brush material or the commutator will wear fast. For smooth commutators with soft mica the brushes should be highly abrasive.

◆ Getting After Condenser Troubles

When a surface condenser is shut down after many months of service, there is no knowing what condition will be discovered until an inspection can be made. Sometimes, results are very pleasing, while in other instances they are astoundingly bad. Considerable progress has been made within the past few years by condenser manufacturers to lessen condenser leakage and condenser tube replacements, improve steam circulation and develop more suitable tube supports and baffles, so as to lessen tube spinning and vibration which have so often been prolific sources of trouble in condenser maintenance.

In many instances, the location of the condenser has been such as to cause trouble, the openings for inlets and outlets and faulty connections made on the job, causing difficulties and troubles with the water circulation. The cost of maintenance in consequence is higher than it ordinarily would be, while the efficiency is lower than otherwise it would be. The condenser manufacturer's responsibility ceases upon completion of the condenser. Better results would be obtained if the manufacturer of the condenser had a louder voice in dictating the way the condenser should be installed and exactly where it should be located. It should be borne in mind, further, that while it is a simple matter to modify plans so long as they are on the blueprint, it is a much more expensive matter when concrete, steel and excavation have already been made. Even so, it is usually cheaper to make a change at the time the condenser is installed than to pay the added cost in the form of higher maintenance costs over a number of years of operation.

Entrained air in the circulating water is undoubtedly the major destructive factor contributing to condenser tube failure. Electrolytic action or electrolysis is also a cause of failure and is the result of stray electric currents entering the condenser from outside sources to the condenser supports and connections. The electrolytic action is usually most conspicuous near the point of tube supports, which is on the inside or steam side of the condenser, and close to the tube sheet. However, the number of tube failures due to electrolytic action are relatively low compared with the trouble due to corrosion as a result of air in the circulating water. One thing to remember, however, is that electrolytic action may be very rapid, and irreparable damage may be done to the tubes unless electrolysis is discovered in time and remedies found to stop it.

With air in the circulating water, corrosion is more widespread. When the water flows through the tubes in a turbulent condition, and especially when the water contains more air than it can absorb, the volume of air forming corrosive gases, attacks the tubes and ferrules and even the tube sheet. In certain instances, the tube sheets have been found to become spongy to a depth of from $\frac{1}{16}$th to $\frac{1}{8}$th of an inch so that it was possible to cut the tube sheet with a pocket knife. Ordinarily, an operating engineer will pack the condenser as he finds it was originally done by the manufacturer. There are many different ways of keeping the tubes in the tube sheet, of making the ferrule and moulding the packing. Whichever method is used may be an important factor in determining the life of the condenser tubes. This is one phase of condenser operation that has been overlooked in the majority of plants.

◆ Simple Depreciation Calculation

The easiest way of figuring depreciation on fixed assets is the so-called straight line method. In a nutshell, it consists of dividing the total cost of the asset by the number of years that it is expected to be available for use—useful life. The result (total cost divided by number of years' useful life) is charged off each year.

For example, suppose the equipment cost $10,000 and has a useful life of 10 years, the annual charge for depreciation would be $1,000 for each of the 10 years.

If the equipment will have a scrap value at the end of its useful life, a logical supposition, then such scrap or residual value should be estimated and deducted from the initial or original cost before deriving the annual depreciation. In other words, the annual depreciation would be figured from the net amount after deduction of the scrap value. In the above case, taking a scrap value of $2,500, the annual depreciation rate would be $750.

It should be borne in mind in estimating the rate of amortization of plant equipment that it is not the life as determined by how long it will last if carefully operated but how soon it may become obsolete because of more efficient apparatus to replace it that should determine the rate of depreciation.

The Great Northern Grinder

U. S. Patents Nos. 1164074 and 1757031

PARTIAL VIEW OF GRINDER ROOM CONTAINING 12 GREAT NORTHERN GRINDERS

POINTS OF OUTSTANDING ADVANTAGE

(1) Production per Stone—25 Tons and Upwards

The large effective grinding area and method of feeding wood to the stone assure high production.

The efficiency of the operator is automatically checked.

Hazards are eliminated, insuring maximum freedom of operation and security to the operator.

(2) Moderate Cost of Installation

Cost of grinders, including installation, is relatively low.

No overhead filling loft is necessary; space occupied is less than for any other type of modern grinder, and where replacing 2-ft. grinders, existing building may be easily adapted to the new installation.

(3) Low Operating and Maintenance Charges

Minimum operating costs are permitted by the high rate of production and by the ease of getting wood to the grinders.

The solid design and sturdy construction insure low maintenance costs.

New stones can be easily installed.

(4) Design of Grinder Adapted for Positive Control of Quality

The surface of the stone is easily inspected and accessible for adjustment.

Wood approaching the grinders is always in view for inspection, and wood is delivered to the grinder by a water conveyor, loose dirt and bark being removed in conveyor.

Automatic temperature controls are easily installed.

(5) Water Conveyor and Ventilation

The water conveying of wood direct to the grinder contributes to a minimum of labor, power consumption, and maintenance expense. It also is a vital factor in obtaining best quality.

Working conditions are healthy; the method of ventilating the grinder eliminating fog in the room even in the coldest weather.

We should welcome the opportunity of making, without obligation on your part, a study of your grinder problems.

MONTAGUE MACHINE CO.

Turners Falls, Mass.

The MONTH at WASHINGTON

BUSINESS SITUATION IMPROVES—The commodity level is encouraging, and the upward movement in prices here and abroad shows a distinct change for the better, according to a survey by Roy D. Chapin, Secretary of Commerce, who reports increased public confidence in analyzing business trends in recent months.

Improving business conditions have resulted in a lessening of demand for federal aid in construction of self-liquidating industrial projects, according to Atlee Pomerene, chairman of the Reconstruction Finance Corporation.

Improvement in banking conditions, stronger security markets, and strengthening commodity prices are strong factors in the economic situation, with trade sentiment improving, says the Director of the Bureau of Foreign and Domestic Commerce, while the declining trend of nearly a half year was reversed in recent months with gains in exports and imports.

The Bureaus of Labor Statistics notes a gradual advance in wholesale prices, with slight setbacks or holding its own, over a period of the last three months, showing no tendency to returning to its old downward status.

Shoe exports rose 74 per cent after a sustained decrease, while imports were the lowest for many months, while business indexes in the main are steadily moving forward, with continued improvement in the textile industry. Carloadings also point to trade revival, a rebound after Labor Day being held indicative of a real uptrend. Fewer bank failures were recorded in the last few months, becoming steadily less. So that the vicious circle of contracting credit and dwindling business and employment is now broken, according to statements issued by the Secretary of the Treasury.

Declaring that the Nation cannot be expected to jump out of its economic depression in a few gigantic leaps, Dr. Julius Klein, calls for new sales ideas as the need of the hour to furnish greater stimulant for business growth. "New ideas for selling old products as well as new products with which to induce a revival of buying," are cited as illustrative of this point to encourage buying by sluggish consumer demand.

New Tax Return Required—Individuals, corporations and partnerships which have made an income tax return under the old Revenue Act for a fiscal year ending in 1932, must file a new return on or before October 15th, according to a ruling by the Internal Revenue Bureau. Any excess found to be due because of the higher rates imposed by the 1932 law may be paid when the return is filed, or in installments. The ruling is known as T.D. 4350.

Bamboo Proposed as Newsprint Base—Bamboo will be used as a raw material for the making of newsprint from a mill to be established in Nairobi, Kenya Colony, Africa, to supply London newspapers. A concession of 50 square miles of forest in Kenya Colony was recently granted to Charles Udall of Nairobi and a mill is to be built near Kijabe, about 45 miles northeast of Nairobi. The mill is expected to be completed within 12 months with a capacity of about 40,000 tons annually.

Causes of Misregister in Offset Printing—The Bureau of Standards has made a report on its study of the offset lithographic process, the industry claiming to suffer an annual loss estimated at 25 per cent of theoretical production resulting from a lack of knowledge of the characteristics of paper required for optimum results in printing on the modern high-speed offset press.

Federal Chemists Show How Acids Damage Paper—Acids even in minute quantities, cause papers to "age" and deteriorate so that they crack when folded. To libraries and to governmental and business offices which must preserve written and printed records for long periods, this aging of papers has been a problem of importance never satisfactorily solved.

Federal chemists have demonstrated that hydrochloric acid and sulphuric acid cause the deterioration of paper. When chlorine compounds are used in bleaching paper pulp hydrochloric acid may form in the finished product unless the pulp is washed out. Alum (aluminum sulphate) is generally used in sizing paper and if present in excessive quantities will cause deterioration of the finished product. Tests by workers in the Bureau of Chemistry and Soils show that no matter how carefully made or how good the original fibers may be, the paper must be virtually free from acid or it will not endure. For permanence excess chemicals should be washed out of the paper pulp and only the minimum quantity of alum used in sizing.

Acid in paper has long been suspected of causing deterioration, but little systematic work has been done to prove the harmful effect of mineral acids. These investigations by T. D. Jarrell, J. M. Hankins, and F. P. Veitch of the U. S. Department of Agriculture included tests of strong unsized all-rag bond paper. This paper showed practically no decrease in strength after being artificially aged by heat for 336 hours at a temperature of 100 deg. C. Varying small quantities of aluminum sulphate, sulphuric acid, and hydrochloric acid, respectively, were incorporated in the paper which was then artificially aged by heating for 72 hours at 100 deg. C. (the temperature of boiling water). Tests of folding endurance, bursting strength, and tensile strength tests showed that of the three chemicals hydrochloric acid was the most destructive, as little as 0.029 per cent acid in the paper causing 22 per cent loss in folding endurance, and 0.040 per cent causing a loss in folding endurance of nearly 100 per cent.

Sulphuric acid present in as small quantities as 0.033 per cent caused about 19 per cent loss in strength as measured by folding endurance, while 0.074 per cent decreased the strength about 99 per cent. Aluminum sulphate had practically the same effect as sulphuric acid when the active acidities were the same.

Books and Publications—"Depreciated Exchange" (Statistics of Exports from the U. S.) is the title of Senate Document, Part 3, 72nd Congress, 1st Session, just released by the Government Printing Office, outlining the effect of the depreciation in the value of foreign currencies upon the exports from this country on important commodities.

"Shipment of Samples and Advertising Matter Abroad" is the title of Trade Promotion Series No. 72, issued by the Bureau of Foreign and Domestic Commerce.

The Commerce Yearbook, 1932, just issued by the Department of Commerce (Volume 1) is an interesting statement of the trend of business and industry in the last 12 months, showing the decline in production, distribution and marketing as the purchasing power of the consumer dropped — in spite of falling prices, and the downward trend was also evidence in banking and finance. The yearbook summarizes the situation last year in all major economic lines, including paper. The surprising thing is that industrial production was 21 per cent above that of the 1921 depression year, 16 per cent less than in 1930 and 32 per cent below 1929, the year the depression began. As a summary of the low mark of the depression, the yearbook is illuminating, showing that business during the fiscal year 1931 (July) suffered from the effects of steady liquidation and falling prices in the commodity and security markets, widespread commercial and banking failures, hoarding of currency, and the impairment of confidence resulting from depressed conditions in this country and developments abroad.

The U. S. Tariff Commission has just issued a report entitled "Bases of Value for Assessment of Ad Valorem Duties in Foreign Countries," being a compilation comparing the provisions of law in 48 foreign countries, describing the method or basis of valuation used in applying ad valorem rates of duty on imported merchandise.

Paper Notes of Interest—The growing use of fiberboard shipping cases in Germany is opening up a market for paper products.

A new paper product resembling pottery has been developed by a Norwegian engineer, the paper being furnished by a mill in Drammen. Patents have been applied for in foreign countries. A sample tray is available in the Paper Division of the Department of Commerce.

This giant CINCINNATI BELT
transmits 400 H.P. *....without strain or slippage*

Traveling at the rate of nearly a mile a minute, this huge Cincinnati Belt, 100′ long, 36″ wide, 10-ply, transmits 400 H. P. from a Corliss Steam Engine to an 8′ diameter line shaft pulley for a large plant in West Virginia . . . without strain, without slippage . . . just a steady hum to indicate that it is doing a big job perfectly.

In paper mills throughout the country Cincinnati Belts are piling up records for unusual, long service and high efficiency. We shall be glad to mail descriptive literature; or, if you prefer, we'll send a representative to analyze your transmission requirements and recommend the proper Cincinnati Belt.

Besides this big Cincinnati Belt on the main drive, there are three other large Cincinnati Belts in operation in this plant. One 70′, 22″, 8-ply; one 60′, 18″, 8-ply; and one 110′, 20″, 6-ply.

THE CINCINNATI RUBBER MFG. CO.
Cincinnati, Ohio

+ CANADIAN NEWS +

◆ Substantial Reduction in Newsprint Price

On September 15th it was announced that Price Bros. had reduced the price of newsprint, making the price to the company's customers in the United States $47.50 a ton, f.o.b. New York, as compared to the former price of $53 a ton, or $5.50 a ton less. The policy of Price Bros. is one of independent action. The company's agreements with its customers contain a proviso that, when any smaller price than stipulated in the contracts is conceded by other newsprint manufacturers, the company will meet the price. In the present instance, it was explained, the company are bringing their contract price down to what the company believe to be the present real market price.

This step was followed by the announcement, on September 21st, that International Paper Co. reduced its price to its contract customers for the balance of 1932 and for the year 1933. The new prices vary from $44.50 to $49 a ton at various points in the United States. Moreover, the company makes an allowance of $1 per ton at certain specified points, including New York and Chicago, at which the company delivers by boat in cargo lots. It is generally understood that this is a move by International Paper to retain some of its very important contracts, including that of the Hearst organization to which International supplies 140,000 tons of newsprint annually.

The extent of this latest cut in the price of newsprint suggests that the chaotic situation in the industry may soon be brought to a head. Any further cut from this level is considered unlikely for, from this point, it becomes most acutely a matter of operating costs, apart from any capital obligations. At the same time it is apparent the rehabilitation of the industry is yet some way off and the manner in which it will be brought about is still a blurred picture. A most important point in connection with the latest cut by International Paper is the fact that the new price is allowed as from June 1 to those customers who sign up to the end of 1937. There is no indication that the powerful bankers' committee, formed some time ago to bring about stability in the industry, has in any way halted its efforts and in that direction lies the most important hope for ultimate success in achieving stability.

Production of newsprint in Canada during August amounted to 157,919 tons and shipments to 154,881, as compared with 142,491 and 145,431 tons, respectively, during July. The Canadian mills produced 206,929 tons less in the first eight months of 1932 than in the first eight months of 1931, which was a decrease of 14 per cent. Newsprint exports during August had a value of $7,251,752, which compares with 6,289,600 in July and $8,416,977 in August of last year. The total of all paper exports was $7,545,883, comparing with $6,515,107 in July and $8,683,177 in August, 1931. The total of all pulp and paper exports for the first eight months of the current year stand at $73,520,041, which compares with $95,547,366 in the same period of last year.

◆ IT IS CLAIMED the first paper mill in Canada was established at St. Andrews in Quebec in 1803. The first mill in Ontario (Upper Canada) was built in 1813 at Crook's Hollow (now Greensville), near Hamilton, and is still in operation. In the Maritime Provinces the first paper mill was built in 1819 at Bedford Basin, near Halifax.

QUEBEC

◆ Gatineau Power Earnings Higher

Gatineau Power Co. and subsidiary companies report increases in both gross and net earnings in the second quarter of this year over the corresponding quarter of last year.

Gross revenue, including other income, was $2,265,323, compared with $2,202,711 in the second quarter of last year; net revenue available for interest and depreciation was $2,148,731 against $1,911,027; and balance added to surplus was $671,121, compared with $372,327. In the twelve months ended June 30, 1932, net revenue available for interest and depreciation was $8,274,081, or two and one-third times the interest on the company's first mortgage 5 per cent bonds and prior liens. After deducting this interest, the balance of earnings was $4,724,446, or four and two-thirds times the interest on the 6 per cent gold debentures of the company.

◆ Price Brothers' Position

Further movements are now said to be under way for the protection of security holders of Price Bros. and Co. In Quebec, the possibility of forming an independent committee for the bond holders is being discussed, and in Montreal preferred shareholders are reported to be forming a committee to take care of their interests. An unconfirmed rumor is that bondholders are being sounded out regarding a proposal to pay interest on condition that the sinking fund is waived for a period of five years and that a clause be dropped which calls for a minimum net working capital.

While Lord Beaverbrook has withdrawn from the picture, consequent upon the non-acceptance of his plan for reorganization of the company, there is a general feeling that he will be an important factor in the reorganization, nevertheless. Not only is he understood to own some 60,000 of the common shares of the company, but he has purchased nearly one-quarter of the company's newsprint output, and is in a position to increase his purchases to nearly one-half of the total output. At present, the affairs of the company are being studied by a protective committee of the bondholders, and it is believed Lord Beaverbrook will have a very definite say as to what plan is put forward for the protection of creditors and bondholders.

According to an official letter recently issued by the company to its preferred and common shareholders, it is improbable that Price Bros. will be able unaided to meet the interest payment which was due on August 1st on its first mortgage bonds. The purpose of the letter was to inform the shareholders of the acuteness of the company's position and to give them notice that "it may be necessary, if their investment in the company is to be protected, for them to provide, at least in part, the required assistance."

◆ Paper Mills Install Electric Steam Boilers

In order to take up the slack in demand for hydroelectric current, Shawinigan Water and Power Co. is encouraging the use of electric steam boilers for pulp and paper plants, thus replacing coal. The old Laurentide plant at Grand Mere has been using electricity supplied at low cost for this purpose for some time.

On September 6 the Wayagamack mill of Consolidated Paper Corp., at Three Rivers, brought into operation a 55,000 hp. electric boiler. This boiler, operated by power from the Shawinigan company, will supply up to 120,000 pounds of steam per hour, which is nearly sufficient to operate the entire mill.

Towards the middle of last month, Anglo-Canadian Pulp and Paper Mills also started up a 55,000 hp. electric boiler, which was the second unit of this size in operation at the Quebec plant. The two boilers together can supply 240,000 lb. of steam per hour, and the full requirements of the mill are supplied electrically.

Still another electric boiler, this time of 33,000 hp., is being installed in the plant of St. Lawrence Paper Mills, Three Rivers, and is expected to be brought into operation about November 1st.

The above-mentioned additional units to the system of the Shawinigan Water and Power Co. bring the total capacity of the electric boilers installed up to 525,000 hp.

◆ ON PASSING THROUGH Montreal after a trip through his company's timber reserves along the north shore of the Gulf of St. Lawrence, Col. R. R. McCormick, publisher of the Chicago Tribune and president of Ontario Paper Co., stated that all the men would be kept at work, the mills would continue to run full time and the steamboat lines would operate to capacity.

◆ NATIONAL TRUST CO., of Montreal, as trustees of the bondholders of Lake St. John Power and Paper Co., will

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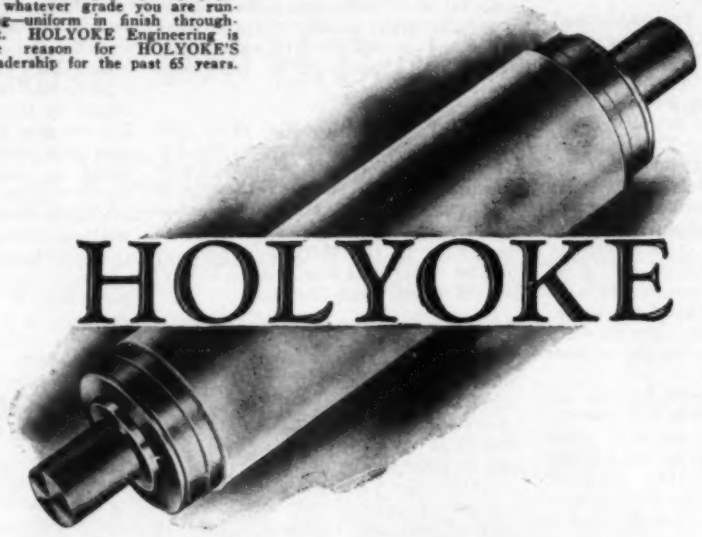
HOLYOKE Cotton and Paper Rolls are precision rolls. Not theoretically so—but actually. The result is a higher quality paper of whatever grade you are running—uniform in finish throughout. HOLYOKE Engineering is the reason for HOLYOKE'S Leadership for the past 65 years.



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LONG LIFE in paper and cotton rolls designed and built by Holyoke Engineers is due to the hundred and one important details which they refuse to overlook. The Outstanding Holyoke-Roll qualities of Resiliency, Uniformity, Long Life, and Heat Resistance are all insured by this insistence upon attention to the finer points of engineering construction.

Write HOLYOKE MACHINE CO., HOLYOKE, MASS., Manufacturers of Super Calenders, Platers, Cotton and Paper Rolls, Washing and Beating Engines, Wood Pulp Grinders, Barkers, Chippers, Rag and Paper Dusters, Rag Cutters, Hydraulic Pumps and Presses, Hercules Water Wheels and Governors.

The HOLYOKE MACHINE COMPANY

FOUNDED 1863

shortly make arrangements for a special meeting to consider conditions arising out of the failure of the company to meet its bond interest due on August 1. Two steps are open to the committee: first, to allow the operations to continue as they are, with some adjustments as to payment of the sinking fund and bond interest; the other, which would naturally come up for consideration in any case, is to work out some form of capital reorganization. From the outset, the major portion of the output of the company, which is one of the units of St. Lawrence Corp., has gone to the Hearst publications. Naturally, the demand for these publications has declined with the reduction of advertising and circulation that has been the decisive factor in the decline of production and sales of newsprint all over the world.

ONTARIO

◆ Abitibi Company in Bankruptcy

On September 10 G. T. Clarkson, Toronto, was named receiver and manager of Abitibi Power and Paper Co. on behalf of holders of bonds of the corporation. Mr. Justice Riddell named the receiver after application was made on behalf of the Montreal Trust Co., trustee for the bondholders. The order empowers the receiver to borrow money from time to time as he may consider necessary to protect and preserve the assets of the company and the carrying on of its business. Any borrowing under this section is to have priority over the mortgage securing the first mortgage bonds and is to be in the nature of a revolving credit.

On September 26 Mr. Justice Robert G. Fisher adjudged the company bankrupt, and appointed F. C. Clarkson liquidator. Except to the extent to which it facilitates straightening out the affairs of the company, this second order has no effect upon the first one and relates solely to any equity that may remain after the claims of bondholders under the first mortgage are satisfied. In connection with these latter claims, the original receiver, G. T. Clarkson, continues to manage the company's affairs.

At the present time, the company is covering operating expenses and taxes, and a portion of bond interests, according to a statement presented at a meeting of the bondholders' committee held in New York last month.

Latest reports are to the effect that acceptance of the Ontario Government's offer to holders of Ontario Power Service Corp. bonds in the Abitibi canyon power purchase, to exchange them for Hydro bonds, is being agreed to rapidly. The Government's offer, however, is subject to 95 per cent of the bondholders agreeing to the exchange.

◆ A BONDHOLDERS PROTECTIVE commitee of Canadian Paperboard Co. was appointed at a recent meeting of bondholders in Toronto, and consists of Gordon McLaren, J. L. Ralston, K.C., Stanley Johnston and J. G. G. Kerry, president of the company. Canadian Paperboard has been in the hands of a receiver since February, 1930. While two of the mills, at Frankford and Campbellford, have been shut down for a considerable period, the plants at Toronto and Montreal have continued to operate. One of the difficulties which has confronted the company, and still exists, is price cutting, which is declared to be rampant in the industry.

◆ OPERATING PROFIT (before depreciation, bond interest and allowance for receivership expenses) of $213,815 was shown in a report presented on September 28 to the bondholders' protective committee of Great Lakes Paper Co. The liquid position shows current assets of $1,658,048 and current liabilities of $586,062, leaving a surplus of $1,071,984.

◆ FIBRE BOXES, LTD., which is controlled by Dominion Boxboards, Ltd., is now working to put a new product on the market, namely, caddy board. This board has an asphalt centre and is lined with glassine.

BRITISH COLUMBIA

◆ PACIFIC MILLS, LTD., pulp and paper manufacturers of Ocean Falls and Vancouver, have awarded the contract for a new addition to the Vancouver plant. The building will involve expenditure of $27,000, and an additional $100,000 will be required for the equipment and machinery to be installed in the new unit.

◆ AS A RESULT of twelve months' effort to prevent accidents, the Port Alice mill of the B. C. Pulp and Paper Co. has been awarded the winner of the mills in British Columbia, for the period June 1, 1931, to May 31, 1932, with a record of one day lost per 2,077 hours worked. The runner up was the Woodfibre mill of the same company, which showed one day lost per 670 hours worked.

NOVA SCOTIA

◆ AT A MEETING of the first mortgage bondholders of Fraser Companies, held last month in Montreal, the amended re-organization plan was adopted, and will therefore become effective as far as the first mortgage bondholders are concerned. All interests have now approved the plan, excepting the 6½ per cent debenture holders, the meeting of whom to pass on the plan was adjourned for 21 days until October 3, because a quorum was lacking.

◆ H. C. ATKINSON, manager of the Port Royal Pulp and Paper Co., which recently acquired the old plant of the Nashwaak Pulp and Paper Co., at St. John, N. B., after a shutdown of two years, stated recently that his company hopes to eventually reach a production mark of 125 tons per month, as compared with a previous high total of the old company of 85 tons. It is expected that the mill will very shortly start producing the high-grade bleached sulphite for which the market is almost totally in the United States, with the prospect of the British market becoming an excellent one should such products be given favorable consideration under the impending tariff readjustments.

◆ A. F. PETERSON, mill manager at Sheet Harbour, N. S., for the A. P. W. Pulp and Paper Co., died at 42 years of age, at Sheet Harbour, after an illness of only four days. He had been connected with the Sheet Harbour plant almost since the beginning of operations and was not only a capable and well liked executive, but a man who filled an important place in the community.

❖ ❖ ❖

◆ Ingersoll Licenses Allegheny

Following the recent announcement of the Ingersoll Steel & Disc Co., Chicago, a division of the Borg-Warner Corp., that they had perfected and patented a commercially successful two-ply stainless steel, comes the more recent news of the consummation of a license agreement with the Allegheny Steel Co. of Brackenridge, Pa., by which the latter will manufacture two-ply stainless steel sheets exclusively under the patents of the Ingersoll company. In disclosing the details of this arrangement, R. C. Ingersoll, president, stated that he was very gratified with this new outlet for the material, as Allegheny is one of the largest manufacturers of solid stainless steels in the United States.

As both companies have been working for some time in an effort to manufacture a low-cost two-ply stainless steel on a large production basis, their joint participation in the marketing of the perfected product tends to assure its eventual widespread use in the many applications where a low-cost corrosion resistant metal is desirable.

◆ A NEW PRODUCT similar to celluloid is being developed in Norway, according to a recent report published by the Department of Commerce. Preliminary production tests have been started in Frederikstad. The new material (which is to be called "Trelit") is said to be the result of long experimentation. It is claimed to be stronger than celluloid and is manufactured from wood pulp. The chief purpose for which this new material will be tested out is toys, but it is anticipated that it will be adopted also for many other products, including buoys for fishnets and life belts, which must withstand the effect of water for long periods.

◆ A New Engineering Firm

Arthur Wright and George W. O'Keeffe have formed an organization to be known as Arthur Wright & Associates, equipment and process engineers. Their main office is at 155 East 44th Street, New York City, with a branch office at 1580 Macadam Road, Portland, Oregon. Other offices are to be established in the United States and Canada.

They will act as general sales representatives of FEinc equipment for Filtration Engineers, Inc., Newark, N. J., and will aim to render an expert engineering service on all problems involving filtration in the process industries.

STANDARDIZE ON LUNKENHEIMER

Fig. 1300
"Sentinel" Oil Cup

Fig. 1815
Bottle Oiler

Fig. 1710
Aluminum Body
"Alsen" Oil Cup

Fig. 540
Screw Lid Oil Cup

Fig. 1301
"Paragon" Lubricator

Fig. 1648
"Glaswick" Oil Cup

Fig. 513
"Tiger" Grease Cup

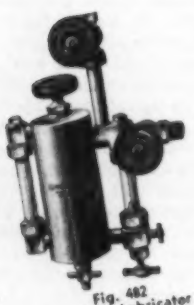
Fig. 482
"Senior" Lubricator

Fig. 510
"Ideal" Grease Cup

Fig. 489
"Banner" Lubricator

Lubricating Devices

Lubricating efficiency, a vital factor in lengthening machinery life and lowering maintenance costs, is materially increased through the use of Lunkenheimer Lubricating Devices.

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The Paper Industry Safety Contest

July 1, 1932, to June 30, 1933

August Scores

38 Mills Continue Perfect Score

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A	Hollingsworth & Whitney Co.	Algonquin & Taconnet	Winslow, Me.
	Champion Coated Paper Co.	Paper No. 2	Hamilton, Ohio
	Spruce Falls Power & Paper Co., Ltd.	Kapuskasing	Ontario, Canada
GROUP B	Champion Coated Paper Co.	Paper No. 1	Hamilton, Ohio
	Consolidated Paper Corp., Ltd.	Laurentide	Que., Canada
	Consolidated Water Power & Paper Co.	Wisconsin Rapids	Wisconsin
	Fraser Companies, Ltd.	Fraser Paper, Ltd.	Madawaska, Me.
	Kimberly-Clark Corp.	Badger-Globe	Neenah, Wis.
	St. Croix Paper Co.	Woodland	Maine
	Bathurst Power & Paper Co.	Bathurst	New Brunswick
GROUP C	International Paper Co.	Piercefield	New York
	Escanaba Paper Co.	Escanaba	Michigan
	Dells Paper & Pulp Co.	Eau Claire	Wisconsin
	Container Corp. of America	Cincinnati	Ohio
	Ticonderoga Pulp & Paper Co.	Ticonderoga	New York
	Consolidated Water Power & Paper Co.	Appleton	Wisconsin
	Ontonogan Fibre Corp.	Ontonagon	Michigan
	Strathmore Paper Co.	West Springfield	Massachusetts
	Marinette & Menominee Paper Co.	Menominee	Michigan
	Cornell Wood Products Co.	Cornell	Wisconsin
	Consolidated Water Power & Paper Co.	Biron	Wisconsin
	Crystal Tissue Co.	Middletown	Ohio
GROUP D	Port Huron Sulphite & Paper Co.	Paper	Port Huron, Mich.
	Port Huron Sulphite & Paper Co.	Sulphite	Port Huron, Mich.
	U. S. Gypsum Co.	No. Kansas City	Missouri
	U. S. Envelope Co.	Morgan Paper Div.	Lititz, Pa.
	International Paper Co.	Livermore Falls	Maine
	Container Corp of America	Carthage	Indiana
	International Paper Co.	Riley	Maine
	U. S. Gypsum Co.	Oakfield	New York
	Hollingsworth & Whitney Co.	Abenaquis	Madison, Me.
	U. S. Gypsum Co.	Gypsum	Ohio

Division II—Remanufacturing

Container Corp. of America	Cleveland	Ohio
Consolidated Water Power & Paper Co.	Stevens Point	Wisconsin
Bird & Son, Inc.	Roofing	Chicago, Ill.
Container Corp. of America	Natick	Massachusetts
Kimberly-Clark Corp.	Atlas	Appleton, Wis.
Bemis Bro. Bag Co.	E. Pepperell	Massachusetts

IMPERFECT SCORES—Division I

	Key	Rank	Points Credit	Points Debit
GROUP A	PA-11	4	809.184	
	PA- 7	5	816.928	
	PA-13	6	724.752	
	PA- 4	7	715.312	
	PA- 3	8	657.296	
	PA- 6	9	555.584	
	PA- 9	10	367.264	
	PA-10	11	72.544	
	PA- 8	12		11,951.168
	PA- 5	13		21,190.032
GROUP B	PB-18	8	810.192	
	PB- 8	9	793.680	
	PB-13	10	721.056	
	PB-21	11	710.288	
	PB-16	12	706.640	
	PB-22	13	660.016	
	PB-20	14	590.376	
	PB-17	15	566.848	
	PB- 2	16	417.248	
	PB- 3	17	57.264	
	PB-12	18		216.992
	PB- 6	19		433.568
	PB- 9	20		626.848
	PB-15	21		771.840
GROUP C	PC-10	13	511.760	
	PC-14	14	265.664	
	PC- 9	15	183.600	
	PC-19	16	19.280	
	PC-17	17		22.144
	PC-25	18		129.680
	PC- 2	19		148.032
	PC- 6	20		712.976
	PC- 7	21		1,773.232
	PC-22	22		1,883.056
	PC-21	23		2,017.712
	PC-18	24		22,287.316
GROUP D	PD- 5	11	512.992	
	PD-15	12	414.880	
	PD-14	13	409.760	
	PD-12	14	348.032	
	PD-23	15	202.224	
	PD- 3	16		275.808
	PD-11	17		347.360
	PD-13	18		350.160
	PD- 1	19		532.048
	PD-10	20		1,480.288
	PD- 9	21		1,513.344
	PD-20	22		4,170.464
	PD- 4	23		4,336.688

Division II

RB-1	7	798.944	
RB-1	8	715.648	
RB-3	9	682.544	
RC-1	10	617.120	
RD-7	11		72.976
RC-3	12		377.232
RA-1	13		4,706.672

No July or August Report: PC-1.
Withdrawn: PC-5.

◆ AS THIS ISSUE of THE PAPER INDUSTRY goes to press, the 21st annual congress of the National Safety Council is being held in Washington, D. C. A report of this meeting, giving the winners in the last contest, will be published in the November issue.

Small rolls sell
—CAMACHINES
produce them

Gummed Tape Rolls

Small rolls sell
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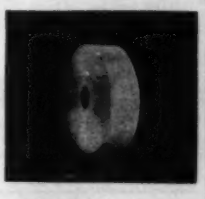

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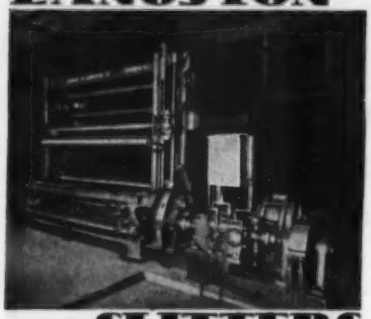

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Temperature Control on Pulp Grinders

By MALCOLM B. HALL
Control Engineer, The Foxboro Company, Foxboro, Mass.

IT IS only in recent years that the real value of automatic control of temperatures on pulp grinders has been fully appreciated. With the introduction of artificial grinding stones and their higher initial investment, automatic temperature control falls into the class of insurance, because not only is the stone protected against the sudden extreme changes of temperature that result from hand control, but the life of the stone is increased from 40 to 50 per cent.

The increased life of the stone, however, is not the only advantage to be derived from automatic temperature control. Temperature changes in grinding are sudden and if not controlled may be of serious magnitude. As a matter of precaution, the operator usually runs the stone at a much lower temperature under hand control than is necessary under automatic control. With the assurance that the temperature will be maintained within reasonably close limits, the stone can be run with higher pressure on the cylinders and in this way obtain a material increase in production. A rather interesting comparison of the temperature record between hand and automatic control is shown in Figure A. It may be

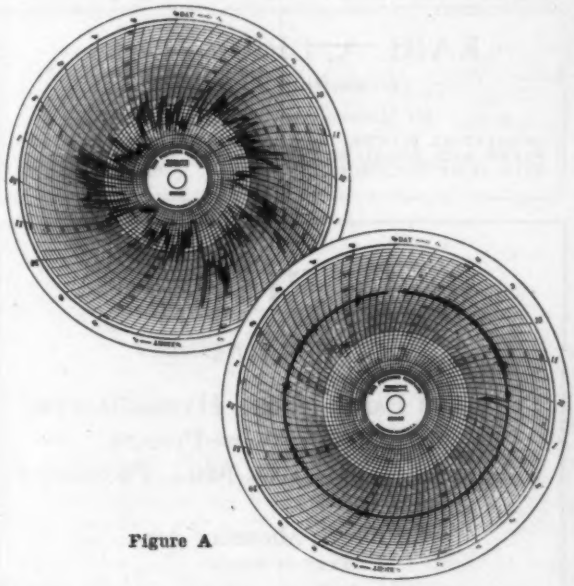


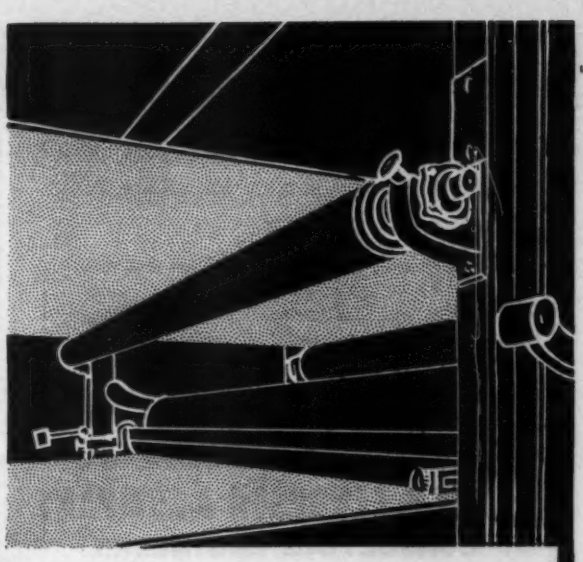
Figure A

observed that the average temperature under hand control is much lower than under automatic control, and demonstrates that under controlled operation the stone can be operated at higher grinding pressures with perfect safety.

In many cases under hand control methods, it is necessary to burr the stones as frequently as every 48 hours. But with the installation of automatic control, burring is necessary only once in ten to twelve days. This, of course, not only increases production by more continuous operation, but offers a very marked saving in the cost of burrs.

The automatic control equipment best adapted to this service is one in which the thermal system consists of a sensitive bulb, which can be run practically the entire width of the stone. This is particularly essential because hard spots in the wood will cause spotty temperature zones. At one instant, the temperature may be high near the center of the stone and in the next instant, it may be high at one edge or the other, but with the sensitive bulb running the entire width of the stone dangerous temperatures in any zone are impossible.

The flow characteristics of the automatic valve which control the rate of flow of cooling water to the spray pipe should



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The principal object of this Hydrator is to produce better paper and to economically hydrate paper stuff more uniformly and to greater degree than present machines.

Another object is to provide a hydrator which causes the stock to go inward against centrifugal force, and outward with centrifugal force, thereby in a series, alternately placing the stock under pressure and vacuum to separate the fibre bundles into single fibres, to spread size and clay thoroughly on each fibre and to thoroughly hydrate the stuff. Another object is to provide a hydrator which rolls the fibre bundles into single fibres without cutting them into short pieces.

Another object is to provide a hydrator which centrifugally separates the dirt and grinds it into fine particles as paint is ground, producing particles so small that they are unnoticeable in the paper; or particles so small that they can be easily washed out of the pulp or easily bleached from the pulp.

With these and other beneficial objects included in APMEW Hydrator; it is manufactured by American Paper Machinery And Engineering Works, Glens Falls, N. Y. Complete information will be furnished upon request.

V. D. SIMONS

Industrial Engineer

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be such that only the necessary amount of water at any particular instant is being supplied and the design of the instrument should be such that the valve supplies only the correct amount of cooling water at any instant.

A recent improvement has been made in pulp grinder control by means of which the spray pipe is automatically

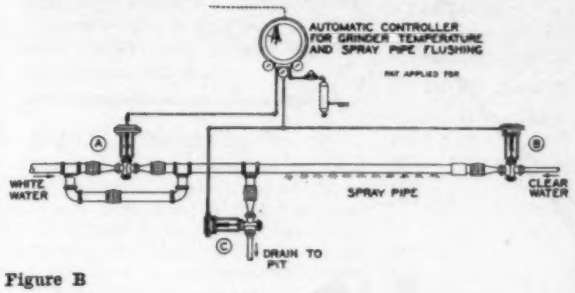

Figure B

flushed out without stopping production. (See Figure B.) This improvement is of such a character that it can be built right into the temperature controller so that the entire operation of controlling the grinder temperature and flushing out the spray pipe when necessary becomes entirely automatic.

Installation of this automatic control equipment is neither difficult nor expensive. Figure C shows diagrammatically

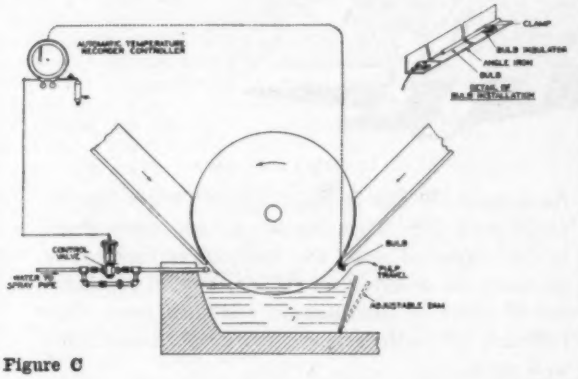

Figure C

the general installation methods. In making the installation, the sensitive bulb of the automatic controller is placed at a point where it receives the full and immediate effect of temperature changes in the ground wood stock. At the same time, it is entirely protected from damage in the operation of the grinder.

From every angle, automatic temperature control on pulp grinders is one of the most profitable investments that can be made in a ground wood mill.

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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press and in the patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

IN THE PAPER INDUSTRY ■ DOMESTIC AND FOREIGN

◆ New Pulp Bleaching Process

Chlorine gas is introduced in the usual manner into the washed pulp, which has been well disintegrated. At the same time, a hypochlorite, for example, chloride of lime, is introduced into the mass. Then the stock is washed under certain conditions with the addition of alkali, and this is followed by a finish bleaching, which is advisably carried out with the aid of a hypochlorite. The chlorine treatment of the mass which still contains lignin results in the conversion of the main proportion of the lignin into chlorolignin under simultaneous formation of hydrochloric acid. The hydrochloric acid is largely absorbed by the fibers, so that when hypochlorite is introduced, hypochlorous acid forms directly on the fibers and on the lignin contained therein. The hypochlorous acid has a strong bleaching action, inasmuch as it is in nascent state. It has been found that due to the rapid decomposition of the chlorolignin formed by the chlorine treatment the pulp becomes lighter in color in contradistinction to the darkening of the fibers caused by the chlorine treatment in combination with the formation of chlorolignin. Dr. Erik Haegglund Abo, Finland. German Patent No. 544,967.

◆ Debarking Wood With Chemicals

Treatment with sulphuric acid will dissolve out hemicelluloses and hexoses from wood. A dilute hot solution of the acid is used of approximately 0.5 per cent concentration. The treatment lasts for 30 minutes to two hours. Hydrochloric acid may also be used in the same strength. Hydrolysis takes place which loosens the bark. The time of the treatment depends on the age of the wood, that is the length of time it has been stored. Acid treatment has been found preferable to steaming. Sulpharous acid is also used for the purpose under a slight pressure. In the case of beechwood, the outer layers of the wood contain considerable pentosans which are difficult to hydrolyze. Much fat and wax is also present and the acid treatment does not give good results. A very dilute solution of sodium hydroxide is useful and causes the bark to decompose into a slimy mass. This can then be easily washed away. The caustic soda solution containing 9.1 to 0.5 per cent NaOH. The treatment lasts from thirty minutes to two hours, according to the age of the wood. Dr. Carl G. Schwalbe. Wochenblatt fuer Papierfabrikation, 1932, number 23A, pages 19 to 21.

◆ Circulation of Stock in the Beater

The circulation of the stock in the beater was studied with the aid of the experimental apparatus shown in Figure 1. The influence of the density of the stock on the power requirements of

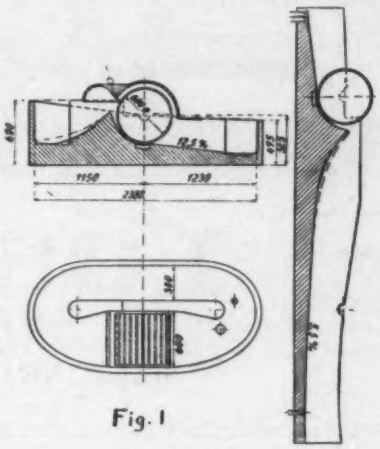

Fig. 1

the beater and on the speed of the circulation of the stock was first studied. The results are shown in Figure 2, in which (N) is the electrical work done by the beater and (w) the speed of the flowing stock in meters per minute, both as functions of (k), the percentage of absolutely

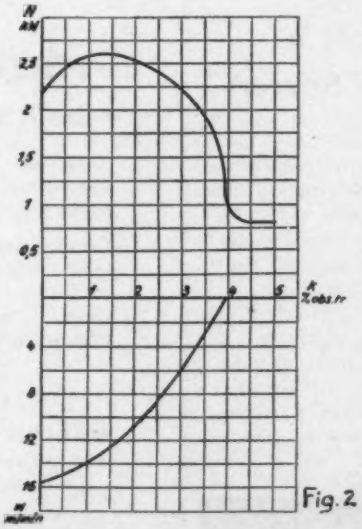

Fig. 2

dry fiber in the stock. The speed of the beater roll (v) was maintained constant at 8.5 meters per second. The quantity of stock in the beater was also constant at 400 kgs. The curve (top) shows how the power requirements attain a maximum at about 1.5 per cent for (k) and then decrease, being constant at about 4.5 per cent (k). The speed of the flow of the stock in the beater is a maximum when pure water is used, and decreases steadily, becoming zero at 4 per cent (k). The effect of the load in the beater on the power requirements of the beater and on the speed was also determined. Figure 3 shows the results. It is seen that the greater the weight of stock in the beater, the greater the power required, and that lower stock densities require more power consumption. This is directly due to the higher speed of circulation of the stock. When the

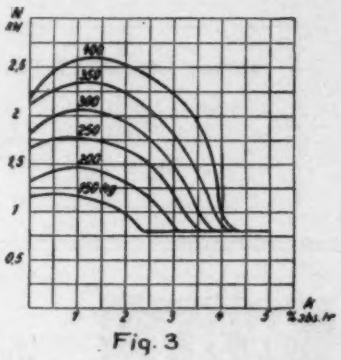

Fig. 3

density of the stock remains constant, the power requirements vary with the load on the beater in almost a straight line relation. The influence of the speed of rotation of the beater roll was also determined. Experiments were made with the beater running empty in air and in water, with various densities of stock and with various loads on the beater. With the beater running in air, there is no appreciable change in power requirements as the speed of rotation of the beater roll changes. When the beater runs empty in water, the power requirements increase as the speed of rotation of the beater roll increases. This is the more rapid, the greater the load on the beater. As the speed of rotation of the beater roll increases, so does the speed of flow of the stock in the beater in a straight line relation for lower stock densities, from 1 to 3.5 per cent. The curves shown in this article are very useful in practical work. W. Brecht, R. Trenschel and W. Bachmayer. Wochenblatt fuer Papierfabrikation, 1932, number 23A, pages 46 to 50.

◆ Loading Paper

The author is mainly concerned with the question, how much filler must be added to the pulp beater, containing (X) kilograms of pulp, to give an ash of (Z) per cent from the paper? This naturally

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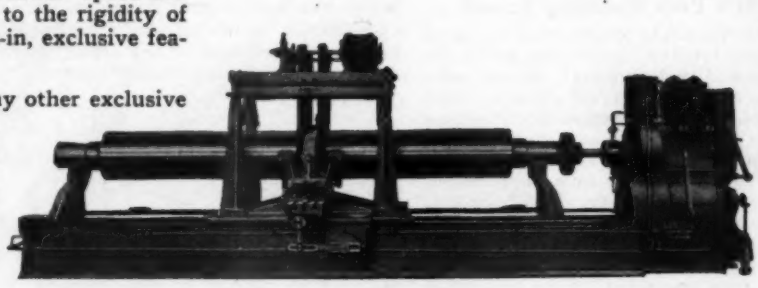

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depends on the amount of filler retained by the pulp fibers, which is governed by a number of factors, such as the nature, structure and form of the fiber, the treatment of the pulp in the beater, the temperature of the pulp and the density of the white water as well as the amount of pulp in the beater. There are also the speed of paper making and the sizing. The use of kaolin and talc is recommended. A number of coefficients have been established over many years of practical experience which can be used in a very simple calculation to give the answer to the above question. Only the figures relating to the use of kaolin or combinations of kaolin and talc are given in the following tabulation.

Kgs. filler per 100 kgs. dry pulp	5%	50%	100%
Coefficients	I	II	III
Paper 40 gms/sq. meter	0.72	0.44	0.32
80	1.26	0.54	0.37
150	1.80	0.61	0.42

For example: if a 150 gms/sq. meter paper is loaded 100 per cent, then the percentage of ash in the paper will be 100 x 0.42 equals 42 per cent. A. Vander Stichel, La. Papeterie, 1932, pages 702-707.

◆ The Beating Process

A study has been made of the effect of the adjustment of the distance between the beater roll and the bedplate. Various experiments were carried out to determine the exact significance of adjusting the beater roll. A suitable experimental beater was designed which gave results comparable with those obtained in practice. Details are given of the dimensions of the beater and of the method used in the experiments. Extra-tough Ritter-Kellner pulp was used in the experiments. The distance between the bedplate and the beater roll was set at

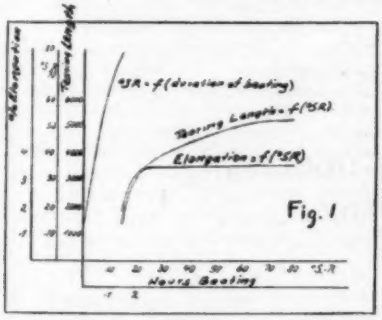


Fig. 1

3.2 mm., and the time of beating at about 30 minutes. The degree of beating was determined by the Schopper-Riegler apparatus. Curves are included showing the relation between the various conditions under which the beater operates. The experiments clearly showed that a considerably larger part of the volume of the slots in the beater roll in the experimental beater must be filled during the beating period than the usual 5 to 10 per cent given for actual practical operation of the beater. When a constant distance between beater roll and bedplate is maintained, the relation between the hours of beating, the tearing length, the elongation and the degree of beating is shown in the curves of Figure 1. The beating tests were made at a density of 6 per cent with a constant specific beating pressure of 2.5 kgs. per sq. cm. A comparison of various tearing length curves obtained at a constant separation between bedplate and beater roll showed

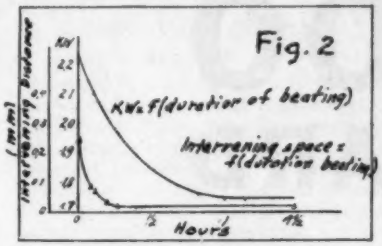


Fig. 2

that the tearing lengths at stock densities of 4 and 6 per cent are the same within the experimental error of plus or minus 5 per cent. The tearing length of the paper made from pulp, 6 per cent density and 0.05 mm. separation between bedplate and beater roll, is somewhat lower in the lower beating coefficients and somewhat higher for degrees of beating of about 55 degrees SR. This indicates that the maintenance of a distance of 0.05 mm. gives a slow beaten stock. Figure 2 shows the relation between the distance of separation of the beater roll and bedplate and duration of beating, etc. Dr. K. G. Jones and P. Schlechter. Wochenblatt fuer Papierfabrikation, volume 63, number 23A, pages 42 to 46.

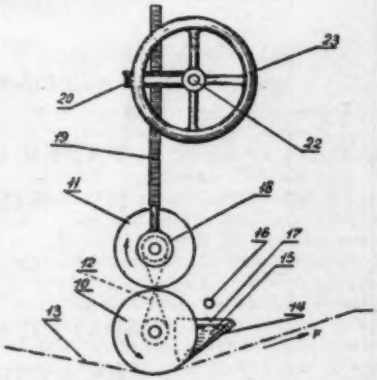
◆ Zero Tearing Length of Pulp and Paper

A method is described for the determination of the zero tearing length and used in testing numerous papers, particularly newsprint and other printing papers containing mechanical wood pulp. The relation between the zero tearing length and the strength of the individual fibers is discussed and is also shown how this method can be used to determine the injury done to the fibers during the bleaching process and other operations carried out on the pulp before it is manufactured into paper. Various curves are given showing the relation between the tearing length in meters and the degree of beating expressed in Schopper-Riegler numbers. The curves cover results obtained in testing bleached sulphite pulp, easy-bleaching sulphite pulp, etc.

It is pointed out that the determination of the tearing length also gives the investigator information of the structural strength of the fiber. This is the product of the fiber strength and the folding capacity of the paper. On the other hand, the determination of the zero tearing length affords an idea of the fiber strength alone. The value of a coefficient which is proportional to the fiber strength lies in that it can be used to establish the extent to which the digestion process must be pushed so that the incrustating substances are dissolved away from the cellulose without injuring the fibers to any great degree. The fiber strength can be considerably impaired while the capacity of folding in the paper is increased on the other hand. Hence the tearing length may remain the same or increase under these circumstances. It is clear that the tearing length coefficient will not afford any information on the injury done to the fibers during the digestion process. The zero tearing length is also useful in establishing how far the bleaching process may be pursued without injuring the fibers. The difference between the tearing length and the zero tearing length coefficients affords a coefficient for expressing the folding capacity of the paper. It is also possible to gain interesting information regarding the distribution of the paper fibers in the length or width of the paper sample by the difference between the zero tearing length determined in the length of the paper and in the width. The efficiency of the shaking device on the wire is thereby tested. E. Grund and H. Weidenmueller. Der Papierfabrikant, 1932, pages 397 to 404.

◆ Applying Liquid to Surface of Paper Web

A liquid, for example a solution of coloring matter, is applied to the surface of a paper web or cardboard by means of the apparatus shown in the accompanying diagram. The essential parts of the apparatus are two metal rollers (10) and (11), the rollers being connected by means of the crossed belt (12),



so that they revolve in opposite directions. The lower roller (10) rests on the surface of the paper web (13) and applies the liquid to it. The paper web moves in the direction the arrow (F) and the pressure of the roller against the paper is sufficient to cause the revolution of the roller and that of the roller (11) as well. A doctor (14) is arranged at a suitable angle with the paper web and forms a trough with the roller (10) containing the solution which is to be applied (15). The solution is constantly added to the trough through the perforated pipe (16) which extends across the width of the trough. The top roller is mounted on suitable bearings (18) which are permanently fastened to threaded vertical rods (19) on which a helical gear runs, shown at (20). There are, of course, two of each of these parts

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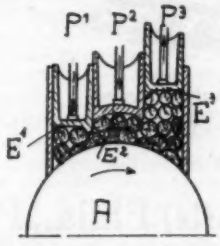
on opposite sides of the roller (11). A wheel (23) is used to move the roller (11) up and down by means of the gear wheels and threaded rods, and a rod (22) connects this wheel with a similar one on the other side of the roller (11). This allows the adjustment of the roller (11) with respect to the roller (10). Societe Anonyme des Anciens Etablissments Victor Weibel. French Patent No. 722,743.

◆ Wood Grinder

The good results, which have been obtained with grinders of the magazine type provided with wide grinding surface, have led to the use of small, narrow pockets arranged one alongside the other to cover the width of the stone. However, this practice has not proven successful. The intermediary walls of the separate pockets do not permit the complete utilization of the grinding surface and the production of fine, long-fibered, splinter-free stock. The new invention



consists in dividing the wide pocket into a number of smaller pockets without however using partition walls, as may be seen in the accompanying illustration. The full utilization of the grinding surface is thereby possible. The pressure applied to the logs of wood against the grindstone is supplied not from a single piston but from a number of pistons. The arrangement of the pocket in this manner allows suitable similar arrangement of the piston area pressing against the logs so that this area is reduced. In the normal operation of the grinder, as shown in the figure, the individual pistons (P^1, P^2 and P^3) all press the wood against the grindstone but the distances between the pressure surfaces (E^1, E^2 and E^3) and the surface of the stone vary. L. M. Voith, Heidenheim, Brenz, Germany. German Patent No. 548,889.

◆ Transparent Paper

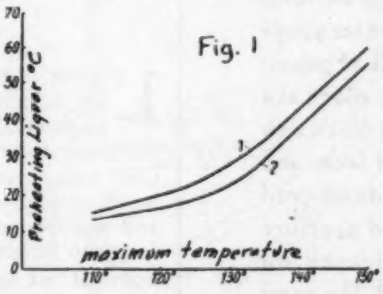
The paper is made in an endless web; it possesses a high luster and is resistant to water and all other solvents, impervious to air and grease, resistant to heat. The transparent paper is coated with a film of a condensation product (urea-formaldehyde product). The film is dried and then heated to about 120 to 150 degrees C. Thus the highly calendered paper made advisedly from sulphite pulp is passed through a solution of the resin in colloidal form, so that both sides of the web are covered uniformly. The excess resin is suitably removed by means of a doctor. The web is then dried by means of hot air. The film is still soluble in water at this point but it is made insoluble by heating for a certain length of time to 120 to 150 degrees C. This is done by passing the web over a large heated metallic cylinder or better still, over two smaller cylinders, whose surface is highly polished. Realisation des Brevets Francais Amouroux et Compagnie, Paris, France. German Patent No. 551,856.

◆ Sizing of Paper for Rotary Intaglio Printing

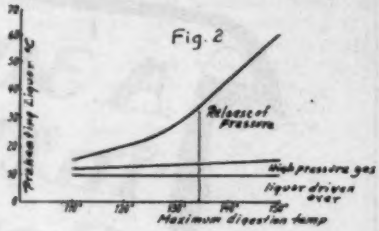
Great care must be taken in the processing of the pulp when intaglio printing paper is made containing considerable amounts of mechanical wood. The principal condition that a paper for printing by the rotary intaglio process must fulfill is absorptivity. When the pulp is too slow, then the paper will not have the proper porosity. The porosity of the paper may be considerably increased by the addition of fillers. The fillers do not fill up the pores of the paper, but reduce their size only. They also increase their number. Sizing is, however, of great importance in fixing the finely ground fillers in satisfactory proportion on the surface of the paper and in the stock itself. Too much size renders difficult the absorption of the printing ink and too little size is manifested in too great absorption during printing. It must be remembered that the diluent in the intaglio printing inks is a good solvent for rosin and hence has a certain destructive action on the sizing in the paper. Correct sizing must overcome all these difficulties or reduce them to a minimum. Calendering the paper as a substitute for sizing is bad practice. Anon. Buch und Werbekunst, volume 9, 1932, page 87.

◆ Preheating Sulphite Liquor Under Pressure

The influence of the temperature of digestion on the preheating of the digestion liquor is shown in graphical form in Figure 1. Curve (1) is for washed out digesters and curve (2) is for blown



digesters. From 150 to 130 degrees C. digestion temperature, the heat liberated decreases therewith in a straight line relation. Below 130 degrees C., this changes. If the pressure on a digester is released at 140 degrees C., a large quantity of the heat in the liquor is released for conduction to the fresh liquor, corresponding to a temperature drop from 140 to 126 degrees C. A digester, which is cooked only to 126 degrees C. releases hardly any heat in the liquor when the pressure is dropped from four to 1.5 atmospheres, since the temperature of the liquor is at least 126 degrees C. at two atmospheres pressure. Figure 2 shows the increase in temperature caused by the heat in the liquor driven over from the digester, in the high pressure gases and in the waste gas. The moisture in



the wood has an important action. If it is 40 to 50 per cent, then the preheating must be carried out to about 5 degrees higher than in the case of air-dry wood. Methods of calculating the temperature gained from the heat in the liquor driven out of the digester are described. It is concluded that the temperature, which is attained in the preheated liquor with the aid of the heat in the liquor driven out of the digester, in the high pressure gas and in the low pressure gas, depends on the temperature of digestion and is higher, the higher the temperature of digestion. This relation is not so strong below 125 to 130 degrees C. The density of the charge in the digester has no effect on the temperature of the preheated liquor. G. Soltau. Zellstoff und Papier, 1932, pages 237 to 238.

◆ Deterioration of Wood Cellulose in Bleaching

The degree of permanence and durability of wood cellulose depends to a marked degree on careful control of bleaching operations. Two distinct reactions may arise during hypochlorite bleaching and lead to the deterioration of the pulp. One is the production of acid conditions giving rise to hydrolysis of the cellulose and the other is a direct oxidation reaction. It should be mentioned that the use of an antichlor in the form of hyposulphite or thiosulphate of soda may also give rise to acid conditions by the production of insoluble sulphonated compounds with the chlorinated lignin. The latter are slowly decomposed during the ageing of the paper and in the case of esparto papers give rise to a pink coloration. Thorough washing of the pulp is necessary to remove residues. The presence of hydrated iron which is strongly absorbed by cellulose plays an important role in the deterioration of cellulose both during bleaching and subsequent ageing of paper. The iron oxide may be present in the pulp before bleaching or it may be present in the hypochlorite liquor. It apparently acts as a catalyst in activating the production both of oxycellulose and hydrocellulose. During hypochlorite bleaching the reaction is so marked that the definite presence of iron oxide renders the production of a light color impossible. Active chlorine is

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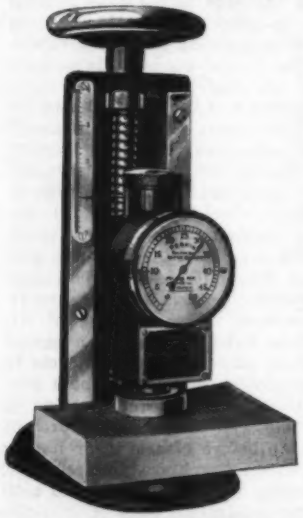

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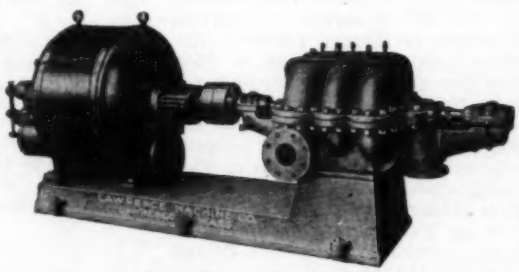

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rapidly consumed and the resulting fiber is deficient in strength. Hydrated oxide of iron alone in the presence of moisture slowly degrades the cellulose on which it is absorbed. James Strachan, the Paper Maker and British Paper Trade Journal, pages TS 225 to 226, 1932.

◆ Hydrogen Ion Concentration and Dyeing Paper

The hydrogen ion concentration is important in dyeing paper, particularly in the making of white shades. Different shades are often obtained in paper when using blues to bring out the whiteness of the same, even though the raw materials are the same and the same amount of dye and sizing is used. The right shade can be obtained by changing the degree of acidity. The pH value is very important with acid dyestuffs, such as orange II, metanil yellow or chinolin yellow. Increase of the pH value leads to fading of the depth of the shade. The more sensitive acid papers absorb the dyestuffs better, although dyestuffs sensitive to acid such as metanil yellow, yield a dull shade with low pH values. Hence each acid dye has an optimum pH value for every stock. Methyl violet requires special attention amongst the basic dyestuffs. Although its reaction interval lies in an acid range (pH 0.1 - 3.2), it may also produce either more blue or more red shades in beater stock of lower acidity (pH 3.5 to 4.5). On the other hand, there are dyestuffs like methylene blue 2R, which keep a constant shade even with varying pH value and with strong solution. It is recommended when preparing dye solutions in paper mills to specify the pH value pertaining to the dye in question. Dr. S. Pestalozzi, Zellstoff und Papier, 1932, pages 238 to 239.

◆ Clouded Paper

This type of paper is made by mixing 12 parts by weight of nitrocellulose with 25 parts of normal butyl acetate, 10 parts of normal butanol, 40 parts of toluene, one part of glyceryl rosin ester, 1.3 parts of tricresyl phosphate and 1.3 parts of castor oil. A red vat dyestuffs, such as indanthrene Red BN, is added to this solution. The mixture is then introduced through a nozzle into a bath containing an aqueous solution of turkey red oil. The mixture is then incorporated with the pulp which is then ready for manufacture into paper. I. G. Farbenindustrie A.G., Frankfurt - am - Main, Germany. French Patent No. 725,069.

◆ Microchemical Determination of Spots

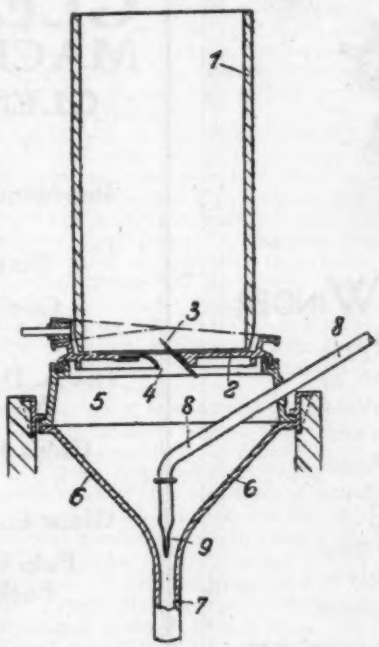
A microchemical method for the determination of the nature of the spots formed in paper during the papermaking process is described. The first test is examination under the microscope. This is followed by treatment with ether and with alcohol. If the spots still remain, they are treated with boiling water. Other tests made are treatment with a dilute solution of potassium ferrocyanide, with a dilute solution of potassium iodide. The presence of free chlorine is detected by means of a dilute solution of starch and potassium iodide. Solutions of tournesol, methyl orange, Congo red and phenolphthalein are used only to determine whether the spots show a reaction due to a derivative of cellulose itself. A silver nitrate solution is used to test for spots which are not visible. The methods are discussed in detail and the various kinds of spots, which may form on paper, are described in relation to these methods. La Papeterie, 1932, pages 346 to 352.

◆ Sulphite Pulp

According to the new process complete digestion of hardwoods, such as fibrous matter containing resins and silica, is accomplished by the sulphite process by the addition of one or more sulphates, which belong neither to the alkali group nor to the alkaline earth group, to the digestion liquor. The digestion is also accelerated by these additions. A particular advantage of the process is that woods, rich in resins, are disintegrated without any difficulty and the resin content of the pulp, which is obtained from these woods, is reduced to below one per cent. Ernst Schmidt, Arnau, Germany. GGerman Patent No. 546,104.

◆ Moving Fibrous Mixtures From Tanks

An interesting, simple device is described for the automatic, mechanical movement of fibrous masses from tanks and pits in which they are collected and stored. In the accompanying illustration, (1) represents the tank or pit. The tank is closed by the revolving bottom



(2). An ejecting device (3) is located in this bottom. As the bottom revolves, the device (3) causes the material to flow out through the orifice (4). The dimensions of the part (2) and of the orifice (3) are such that on a complete revolution of the part (3) a quantity of fibers and water is ejected equal in volume to the volume determined by the area through a transverse section of the tank and the height of the part (3). Thus a continuous removal of material across the entire width of the tank takes place. The rotating bottom (2) is held on the support (5) and also a lower funnel-shaped part (6) which contracts into an outlet (7). A compressed air pipe (8) is arranged within the funnel-shaped part which ends in a nozzle (9). This extends right into the outlet (7). Linke Hofmann Busch Werke A.G. French Patent No. 723,669.

◆ Chemistry of Sulphite Cellulose Process

The authors are mainly concerned with the sulphonation of lignin in the wood and the formation of acetic acid during the digestion. The lignin absorbs sulphur by treatment with bisulphite liquor at below 100 deg. C. The speed of reaction depends on the concentration of the liquor. Sulphurous acid sulphonates lignin more quickly than sodium bisulphite. Large quantities of acetic acid are formed when a four per cent sulphurous acid solution is used. The quantity of sulphur dioxide, loosely combined in the sulphite liquor, corresponds to the quantity of acetic acid formed, indicating a glucosidal combination of the acetic acid in the wood. Erik Haegglund, Axel Ekwall and J. Hostomsky. Wochenblatt fuer Papierfabrikation, 1932, number 23A, pages 26 to 30.

◆ Papermaking Inventions

Improved Fourdrinier—Ed. J. McDonnel, Groveton, N. H., has been granted patent rights on an improved fourdrinier part, being a combination to form an extended table beneath the wire and over which the wire passes. The parts forming the combination of table are adjustable to control the discharge of water from the stock as it passes over the wire. Patent 1,856,347, May 3, 1932.

Cigarette Paper — A process for the manufacture of cigarette paper consisting in the incorporation in the cigarette-paper pulp, during manufacture, of a natural gum containing soothing and sweetening elements, is provided in a patent issued to S. C. Patents, Ltd., London, Eng., Jan. 5, 1932.

Rubber-Fibre Products — Dispersions Process, Inc., Dover, Del., has been assigned by George P. F. Smith and Thomas G. Richards, the patent on a process for the manufacture of rubber-fiber products. An aqueous dispersion of waterproof binding material and a loose mass of fibrous material containing vulcanized rubber of a flowable consistency is the chief feature. Patent 1,841,067, Jan. 12, 1932.

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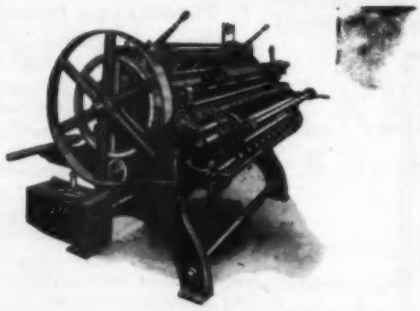

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The COMMERCIAL OUTLOOK

New York, October 1, 1932.

ACTIVITY within the paper industry is expanding at a very gratifying pace. Demand for various kinds of paper and for paper board has increased substantially in recent weeks; orders have been received by manufacturers in number and volume to an extent necessitating the speeding up of production, and there is no question that many paper mills now have a larger booking of orders than they have enjoyed in a long while. From all indications, much of the buying recently has been of delayed character; that is, buying which should have been done months ago but which consumers and converters, as well as jobbers, held back pending improvement in the general business situation and within their own specific spheres which has been seen during the last couple of months. In short, present demand for the product of paper and board mills is of the healthiest sort; not only is it against definite, and in some cases pressing, requirements but also represents business which should have come to mills some while back.

While current statistics are not available, there is no doubt the industry as a whole is now on a broader scale of activity than probably any time this year; certainly as far as the last few months are concerned. Attesting to their confidence in the general situation and their faith that the upturn in business in numerous lines constitutes a real movement out of the depression, many large organizations in varied branches of industry have inaugurated buying campaigns aiming to cover their anticipated needs for some time ahead.. This, in conjunction with the increase in demand brought about by the expansion of requirements as a result of the improvement in numerous lines of business, has been creative of much more demand for paper and board. Advertising is gaining, and as a direct result consumption of newsprint and book papers is rising, so that mills are called upon to provide larger supplies of these papers. By way of example, daily newspapers in New York which a couple of months ago were averaging 32 to 36 pages in their weekday issues are now running 46 and 48 pages almost every day. Business concerns are conducting more advertising campaigns by mail and otherwise, and printers are using appreciably larger amounts of fine and other printing papers. Retail trade is showing a marked increase, leading to bigger consumption of and broader demand for wrapping, tissue and other papers, and paper boxes and bags. It is a fact that certain paper mills which only a short time ago were on shorttime schedules of three and four days a week are now operating full daytime shifts and some night shifts. An authority in the trade who is in a position to make an accurate guess estimates that the increase in demand for paper of all kinds within the last two months has been 25 per cent.

Despite the distinct gains in consumption and production of paper, recent developments have not been altogether favorable for the industry. Prices of paper are not what they should be. There have been price reductions, in newsprint particularly, and much complaint is heard from manufacturers anent the lack of profit margin provided by prevailing market prices. True enough raw materials are low, according to nearly all comparisons, but so are prices of the finished product—too low, most paper manufacturers assert. There have been price advances in some quarters but they have been slight at best, and, from a general standpoint, have been more than offset by declines in other divisions of the industry.

A drastic cut in the contract basis on standard newsprint of $7 per ton has been instituted by the International Paper Company, bringing the market level down to $46 a ton at cities in the territory where the price was $53, which includes New York and Chicago. This reduction followed the announcement of a cut of $5.50 a ton by Price Brothers & Co., Ltd., one of the leading producers in Canada. Although other companies have delayed making announcements regarding their prices, it is likely, if not almost certain, all the principal manufacturers on the Continent will adopt the lower price schedule. It is commonly agreed within the industry that newsprint mills face tough sledding covering their manufacturing costs at the lower price basis.

Quotations on fine papers have stiffened in tone although no definite changes have been recorded. Kraft paper prices remain on a very unfavorable level, but kraft liner board has been increased $2.50 a ton, representing the first advance in this item in over 18 months. Prices of all boards have firmed; mills in the East are now quoting $25 a ton on plain chip and filled newsboard for delivery in New York City, while $27.50 is the basis named in some consuming centers.

Production of newsprint in the United States in August amounted to 79,529 tons and shipments from mills were 77,340 tons, compared with 74,502 tons produced and 76,857 tons shipped in the preceding month, while in Canada, 157,919 tons were produced and 154,881 tons shipped during August, against 142,491 tons and 145,431 tons, respectively, in July. Total output for the two countries in August reached 237,448 tons, contrasted with 216,993 tons in the preceding month, and shipments from mills aggregated 232,221 tons, against 222,288 tons. During August, 23,513 tons of newsprint were manufactured in Newfoundland and 1,484 tons in Mexico, so that the total North American production for the month amounted to 262,445 tons, contrasted with 242,603 tons in July.

Canadian mills produced 206,929 tons less newsprint in the first eight months of 1932 than in the same time last year, a decrease of 14 per cent. The output in the United States was 80,812 tons or 10 per cent less than a year ago; in Newfoundland 8,235 tons or 4 per cent less, and in Mexico 1,635 tons less, making a North American decrease of 297,611 tons or 12 per cent. Stocks of newsprint at United States mills at the end of August were 35,982 tons, and at Canadian mills 50,029 tons, making a combined total of 86,011 tons, compared with 80,784 tons a month previously.

Paperboard production in the United States in July totaled 151,585 tons, compared with 171,093 tons in the preceding month and 222,927 tons in the similar month last year, according to the monthly compilation of board statistics by the U. S. Department of Commerce. Board output during the first seven months of the current year reached 1,246,632 tons, against 1,553,081 tons in the corresponding period of 1931, and 1,613,194 tons in 1930. New orders received by mills in July called for 151,388 tons of board, contrasted with 166,129 tons in June, and unfilled orders at the end of July were for 24,113 tons, against 29,802 tons a month before. Shipments from mills during July aggregated 157,077 tons, compared with 167,728 tons in the preceding month, and stocks of board at mills at the close of July were 78,973 tons, against 84,465 tons at the end of June.

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◆ Texas Paper Mill Now Operating

The Commercial Pulp and Paper Co. of Orange, Texas, a company which purchased and remodeled the old plant of the Yellow Pine Paper Mill, is now operating its plant with 100 on the pay roll. When the plant is operating at full capacity, as is planned within the next few months, the total number employed may be increased to 300.

The plant is now manufacturing kraft paper from yellow pine. It is expected that very shortly it will go into the production of second-grade bond, news, book, tissue and other paper specialties, which will be made largely from rice straw.

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Domestic RAW MATERIALS

◆ Papermaking Rags

The market for papermaking rags is exhibiting a stiffening tendency. As was contended by those on the selling side of the trade for some while, the increased buying interest manifested by manufacturers recently has created a firmer tone in rag prices, and those grades in principal movement to mills not only present a stronger trend but have registered at least slight advancement. Buying by consumers has not assumed any broad dimensions, yet orders from mills have come into the trade in larger number of late, and it probably is not going too far to state that the absorption of certain kinds of rags has been sufficient to result in something bordering onto a scarcity of such grades.

Paper manufacturers are buying rags, as they are practically all raw materials, in a cautious manner. There is very little or no disposition shown to stock up, even though it is recognized that rag costs are low in any comparison and notwithstanding the belief shared in by consumers themselves that should demand attain anything approaching normal volume, the likelihood is market prices would rise to higher levels than now prevail. Manufacturers are acquiring supplies as their needs arise; purchases in recent weeks have increased but nearly all the buying has been against actual and immediate requirements, papermakers adopting the policy of covering current wants only and permitting the future to take care of itself.

Odd as it may seem, the firmest grades of papermaking rags are the highest class of such material or No. 1 new white shirt cuttings, and the lowest variety of cotton rags or roofing stock. Dealers who a short time ago accepted in the vicinity of 3.50 or 3.75 cents a pound at shipping points for No. 1 white shirt cuttings are now asking and reported securing around 4.25 cents for these rags, while roofing rags have advanced to the extent of about $2 a ton to a basis of 60 cents per hundred pounds for No. 1 classification packing and 45 to 50 cents for No. 2 stock f. o. b. dealers' points in the East. Other new cuttings are in more demand and firmer quotably, including unbleached muslins at about 5.50 cents a pound at shipping points, new light silesias at 3.50 cents, blue overall cuttings at 3.25 cents, fancy shirt cuttings at 1.50 cents, and bleached shoe cuttings at 3.75 cents.

Old white cottons are reported selling better though at little change in price, and twos and blues and thirds and blues are in somewhate improved demand. Desirable packings of No. 1 repacked whites are available at 2.75 to 3 cents a pound at shipping points, No. 2 repacked whites at 2 cents, twos and blues at 1.30 cents, and repacked thirds and blues at a cent per pound. Few rags are coming in from foreign sources, importers asserting that prices prevailing in other countries are still above a parity with market levels here and thereby putting them to a disadvantage in buying for American paper mills.

◆ Rope and Bagging

Paper mill demand for old rope is noticeably limited. Indications point to manufacturers of rope papers obtaining more orders for their product, but it appears they have ample supplies of old rope on hand and are more intent on using up stocks than in augmenting supplies. There is, of course, a certain amount of routine buying but demand otherwise is of scant consequence, and prices of old rope are somewhat easier on a level of 1.40 to 1.50 cents per pound f. o. b. shipping points for No. 1 domestic old manila and 1.35 cents to a shade higher ex dock New York for No. 1 foreign manila rope. Bagging is moving fairly freely to paper mills and prices show a hardening tendency, with some sales recorded at slight advancement in price. Strictly No. 1 scrap bagging is bringing around 85 cents per hundred pounds at shipping points or 1.00 to 1.10 cents a pound delivered mills, while roofing bagging is fetching 35 and 40 cents per hundred at points of shipment. It is claimed that available supplies of bagging are short, and dealers evince caution in entering sales commitments.

◆ Old Paper

Everything considered, there is a fairly good demand for waste paper of most grades. Board and paper mills alike are buying in larger volume, reflecting improvement in their own markets and the speeding up of mill production, and while no broad changes have occurred in prices, such revisions as have been noted have been in an upward direction almost without exception, and some grades appear pointed higher. Dealers are asking around $33 a ton f. o. b. shipping points for No. 1 hard white shavings, $28 for No. 1 soft white shavings, $33 for one-cut soft white shavings, and $32 for No. 1 hard white envelope cuttings. Book stock has scored an appreciable rise to where mills are paying 55 to 60 cents per hundred pounds at eastern sources of supply for No. 1 ordinary flat stock and 65 cents for strictly heavy flat books and magazines, with above these prices ruling in the Middle West. Folded newspapers are selling freely in the East at $7 a ton at dealers' points, and No. 1 mixed paper at $2 to $3 a ton. Old kraft paper has advanced to a price basis of 90 cents to $1 per hundred pounds in the East, while new kraft cuttings have sold at 1.50 cents a pound at shipping points, white news blanks at 1.05 cents, and overissue newspapers at 45 cents a hundred pounds.

◆ Pulpwood

Consumers are absorbing supplies of pulpwood through contract channels but evince limited desire for additional quantities. Prices adhere to about unchanged levels. Exports of pulpwood from Canada to the United States in August were 59,399 cords, valued at $580,429, against 82,344 cords of a value of $717,969 in the preceding month, and 134,220 cords of a value of $1,415,121 in August, 1931.

◆ Mechanical Pulp

Demand for mechanical wood pulp continues slow decidedly, although some little improvement has been noted recently. Most consumers seem to have their requirements covered by incoming commitments against contracts, and only occasionally are they operating as buyers in the open market. Meantime, producers are endeavoring to drum up more business and in some cases are not hesitating to offer pulp at attractively low prices as an added inducement to consumers to purchase. Canadian groundwood is quoted generally at around $18 per ton f. o. b. pulp mills across the border, but prices depend largely on the haul to consuming centers and it is said that some groundwood has been bought in Canada down to as low as $15 at grinding plants. Domestic manufacturers are succeeding in selling very little mechanical pulp in the outside market. The price level on domestic is about $19 or $20 a ton at shipping points, also depending on the freight to consuming mills and the air dry test.

◆ Chemical Pulp

With activity within the paper industry increasing and with pulp consumption on the rise, a firmer price tone is apparent in chemical wood pulp. No actual advancement has been registered in the market but it is noted that producers are adopting a stronger attitude regarding prices and seem bent on receiving full quoted figures when making sales. In short, there isn't that degree of selling pressure that was in evidence up to recently, and buyers are finding it more difficult to dictate concerning prices than was the case not long ago. Bleached sulphite is particularly firmly quoted. The basic price of 2.10 cents per pound on such pulp ex dock Atlantic seaboard is named by practically all sellers, and it is said that only in exceptional instances are concessions of a dollar or two per ton being allowed. Unbleached sulphite is holding to a price level of about 1.60 cents at pulp mills for prime grade pulp, with some mill brands available at a little under this price and with others quoted higher. Domestic kraft pulp is on a wide quotable range of 1.60 to 2 cents a pound at pulp mills, while bleached soda pulp remains at 2.25 cents a pound delivered book paper mills.

◆ Chemicals

About the only change of consequence in papermaking chemicals is a rise in prices of casein to 6 cents a pound for the domestic standard ground and 7 cents for the finely ground. Argentine casein is selling at 8 to 8.50 cents, according to quality.

CHEMICAL AND MECHANICAL PULP

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Kellner-Partington Paper Pulp Co. Ltd.
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Hallein and Villach, Austria

UNBLEACHED SULPHITE

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Bergvik och Ala Nya Aktiebolag, Söderhamm, Sweden
Svanö Aktiebolag, Svanö, Sweden
Aktieselskabet Greaker Cellulosefabrik, Greaker Norway

KRAFT PULP

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

It is generally acknowledged in various corners of the trade that demand for imported wood pulp is restricted. The market is quiet, based on nearly all comparisons with previous years and this period of the year, yet there is little doubt that recently some expansion of buying interest has been evinced among paper manufacturers. This increase in demand, even though slight, was to be expected in view of the more favorable condition of the paper and board market and the necessity of manufacturers to step up at least to some extent their production operations.

However, the main obstacle to broader trading in wood pulp would seem to be that a large majority of paper mills have all the pulp on hand, or on order, that they need for some time to come, more especially on the basis of current consumption. The quickening of paper demand and the increase in manufacturing has, of course, created a better atmosphere in the pulp market and placed pulp in an improved position from the angle of what may occur in the not distant future, but the fact remains available supplies of pulp in the storehouses of paper mills, coupled with the tonnages consumers have coming against contracts or old orders, are ample for present needs, with the result further buying is being indulged in only in a cautious manner and in rather limited volume.

Consumers apparently realize that with the strike in the Swedish mills a thing of the past and production in that country now in full swing, with world consumption of pulp at a low ebb, and with stocks in the various European producing countries doubtless large, any appreciable rise in market prices is improbable, and therefore are in no hurry to add to their supplies of their chief raw material. Purchases are being made off and on by various paper mills but signs are that most of the current buying is of filling-in variety, or else of far-off shipments from abroad, some papermakers evidently feeling that they are making no mistake in covering a portion of their future requirements at prices now prevailing.

Perhaps the feature of the situation in imported pulp is the maintenance of quoted prices in the face of the quiet market obtaining. It is perfectly true that many transactions—doubtless a majority—are at prices constituting slight concessions from recognized market levels, since buyers are demanding and in most cases are securing supplies at a little under the market bases named. For example, the basic quotation on prime bleached sulphite is 2.10 cents per pound ex dock New York or other American Atlantic ports, yet purchases are frequently recorded at a dollar or two per ton below this price, although it is declared little or no bleached sulphite of prime quality is to be had at less than 2 cents ex dock. Prime strong unbleached sulphite is quoted at 1.60 cents on the dock Atlantic seaboard, but some brands are reported offered at 1.50 cents and probably at slightly under this latter price. Kraft pulp gives more indications of easing than other pulps, and while the basic level on prime imported kraft is 1.50 cents ex dock, it is said that such pulp is available at 1.35 cents, and in exceptional instances down to 1.30 cents per pound. Imported groundwood of Scandinavian origin is quoted at $17 to $18 per short ton Atlantic seaboard, though purchases at concessions from this price basis have been reported. European producers of groundwood are organizing a new marketing body or selling unit, which when in operation may lead to a stiffening of prices on foreign mechanical pulp.

Future market levels on wood pulp rest, it is generally admitted, on the volume of consumption reached in the next few months. If world consumption, and more especially in the United States, assumes more normal tonnage, producers in Europe are likely to fully maintain present prices if not mark them up a bit, but unless consumption conditions improve substantially and pulp stocks in Scandinavia and elsewhere are reduced and current production absorbed, market weakness is as likely as not to develop.

Pulp imports into the United States fell to a new low during July for any month this year up to that month, according to official figures released by the U. S. Department of Commerce. July imports of chemical pulp amounted to 54,578 long tons, valued at $2,075,424, compared with 64,011 tons of a value of $2,433,032 in the preceding month, and 107,230 tons of a value of $4,569,980 in the similar month of 1931. Mechanical pulp imports in July were 10,389 long tons of a value of $187,480, against 15,826 tons of a value of $430,374 in the corresponding month last year. The July imports brought the total of chemical pulp for the first seven months of this year up to 644,227 long tons, contrasted with 669,427 tons imported in the same period of 1931, while groundwood imports in the seven-month period were 90,487 long tons, against 99,934 tons in the same time a year ago.

◆ Paper Stock

Importations of rags for papermaking into the United States in July continued on a small scale, amounting to 5,289,306 pounds of a declared value of $78,611, according to U. S. Department of Commerce statistics, comparing with 4,047,527 pounds of a value of $59,166 in the preceding month, and 11,394,108 pounds of a value of $157,187 in the similar month last year. Imports during the first seven months of this year were 50,748,179 pounds, valued at $675,561, compared with 73,736,314 pounds of a value of $1,006,960 in the same time of 1931. Imports of miscellaneous paper stock in July last amounted to 5,522,488 pounds of a value of $51,037, contrasted with 12,026,674 pounds of a declared value of $133,386 in the similar month last year.

◆ Paper

Paper imports into this country in July last reached a value of $7,348,414, contrasted with receipts of a value of $10,246,881 in the same month of 1931, and bringing the total for the first seven months of this year up to $58,116,442, against $76,342,584 in the corresponding period a year ago. The bulk of these imports was standard newsprint paper, the value of which amounted to $51,913,962, against $67,662,114 last year.

EXPORTS

Exports of paper and paper products from the United States remained on a light scale during July, shipments of all grades reaching a total value of $1,202,860, compared with $1,930,585 in the same month last year, and making a total for the first seven months of this year of $9,736,959, contrasted with $14,056,450 in the corresponding period of 1931, according to figures issued by the U. S. Department of Commerce.

Newsprint shipments abroad in July were 1,883,376 pounds of a value of $50,635, against 1,098,206 pounds of a value of $35,013 in the same month a year ago, while book paper exports were 1,783,206 pounds of a value of $86,803, compared with 1,573,920 pounds of a value of $92,891 in July, 1931. Wrapping paper shipments reached a value of $133,621 in July, showing an increase from the $116,165 worth exported in the similar month last year, and writing paper exports were valued at $70,668, against $116,002 in July a year ago. Paper bag exports were valued at $40,462 in July, against $66,163 in July, 1931, and shipments of paper boxes were worth $47,118, contrasted with $85,862 last year. Boxboard exports

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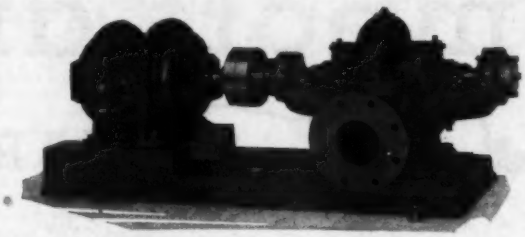

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were of a value of $34,534 and other paperboard $44,870, against $96,444 and $120,092, respectively, in the same month a year ago.

Exports of paper base stocks, including wood pulp, rags and other paper stock, were valued at $199,860 in July this year, compared with shipments of a value of $555,750 in the corresponding month of 1931.

❖ ❖ ❖

◆ Howard Interests Buy Centralia Plant

The Howard interests, which control the Aetna Paper Company, Dayton; the Howard Paper Co., Urbana, and the Maxwell Paper Company, Franklin, all in the State of Ohio, have purchased the equipment and business of the Centralia Envelope Co., Centralia, Ill.

At this time, it is announced that the equipment will likely be moved to Dayton, Ohio, where the purchasers will operate a new company, to be known as the Howard Envelope Co., representing an investment of more than a million dollars when completed.

Col. Maxwell Howard, president of the Howard, Aetna and Maxwell mills, will head the new company, and Howell H. Howard will be general manager. The new company has an option for lease with privilege to purchase the group of buildings formerly occupied by the Chrysler Motor Car Company on Leo Street, Dayton. An alternate plan under consideration, is that of erecting a new plant adjoining the Aetna Paper Co., Dayton. As soon as a decision is made as to the location, the work of removing the machinery from Centralia will be undertaken.

The Centralia Envelope Co. is one of the largest envelope manufacturing plants in operation.

◆ THE ALBANY PAPER CORP., which recently took over the plant of the Bahr Refiners Paper Corp., at Albany, Ind., has commenced operation with a force of about 30 employees. The plant will manufacture paper, boxboard and paper and boxboard products and it is expected that the number of employees will soon be increased. The plant had been idle for the past several years.

◆ THE SEMINOLE PAPER CO., a subsidiary of International Paper Company, has announced receipt of an order from Kroger Grocery and Baking Company, for thirty-eight carloads of tissue paper, which they claim to be the largest single order for that grade of paper ever placed in the country. The order is being filled at the company's plant at Marinette, Wis., and is resulting in capacity operation of that mill.

◆ A. J. SLOMANSON, formerly with the P. F. O'Keefe Advertising Agency, has joined the Gotham Advertising Company, New York City. Among the accounts in the paper and pulp field handled by this agency are E. D. Jones & Sons Company, Pittsfield, Mass., American Delthirna Corporation and Edgar Brothers Company, New York.

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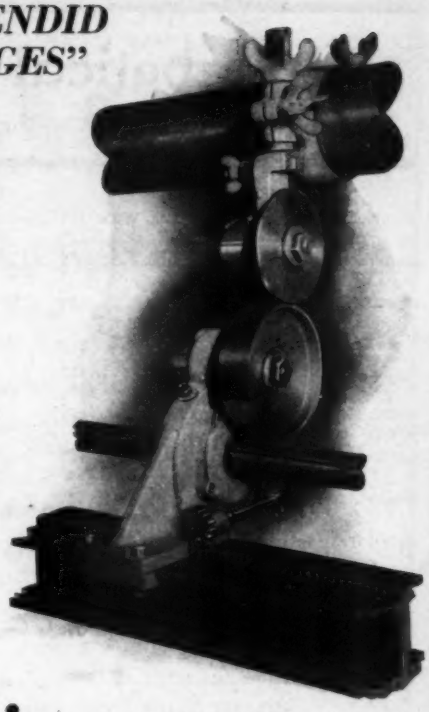

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